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ABSTRACT

This study to determine the hardware and computing facility costs of establishing and operating a British Columbia Library Network (BCLN) for current members of the B. C. Union Catalogue used empirical data regarding their performance of the DOBIS system and estimates of workload, and compared those data with the costs of obtaining current computer-utility services from the University of Toronto's UTLAS system. Hardware and computing facilities requirements, including teleprocessing network evaluation criteria and software support evaluation criteria, are explored. Request for proposal (RFP) information is provided. (FM)

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Ministry of Education (Project Planning Centre)
Library Needs Assessment
BCUC Replication Study Document
Design Phase: BCLN Hardware and Computing Facilities Evaluation Study

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BCLN HARDWARE AND COMPUTING FACILITIES EVALUATION STUDY

Final Report

by

Stephen H. Smith

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BCLN - HARDWARE AND COMPUTING FACILITIES

EVALUATION STUDY FINAL REPORT

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Prepared by S. H. Smith, Systems West Consultants Ltd., April 1981

EXECUTIVE SUMMARY

Overview

The BCLN - Hardware and Computing Facilities Evaluation Study was undertaken by S.H. Smith, Senior Consultant and Victoria Branch Manager of Systems West Consultants with assistance from J. Nealon, consultant also of Systems West. The Study commenced in early December 1980 and was completed with the acceptance of the final report by the Project Manager, B.C. Union Catalogue, in April 1981.

The basic objective of the Study was to determine the costs in terms of hardware and computing facilities of establishing and operating a B.C. Library Network using the DOBIS system, for current members of B.C. Union Catalogue. These costs were then to be compared with the costs of obtaining current computer-utility services from the University of Toronto (UTLAS system) to determine the economic feasibility of establishing an in-province facility.

The approach taken in the Study was to determine the requirements of BCLN for hardware and computing facilities support using empirical data regarding the performance of the DOBIS system and estimates of workload. Based upon these requirements, proposals from potential suppliers of hardware and computing services were solicited by means of a Request for Information. The responses and subsequent evaluation form the basis of the cost estimates used in determining economic feasibility.

Conclusions

. The establishment and operation of BCLN-DOBIS is economically feasible. Over a six-year period total savings would be realized at net present values of $1.63 million if cataloguing functions alone were supported.

If cataloguing, acquisitions and inter-library loan functions were supported total cost savings and cost avoidance would be realized at net present values of $9.43 million.

Additional benefits of BCLN-DOBIS are:

- DOBIS will provide British Columbia libraries with a superior on-line union catalogue system, including the following selected improvements:
  a. All records immediately accessible on-line
  b. Additional searching and retrieval features
  c. Novice and expert operator modes
  d. Further elimination of redundant keying and editing
  e. Integrated design for authorities control

- The BCLN organizational design will ensure that services and development priorities match B.C. libraries' needs and that the organization will be more responsive to BCLN member libraries.
- Replication of an existing and proven system minimizes the risk and costs of system development and start-up. Future development costs can be shared with the National Library of Canada.
- The BCLN-DOBIS facility provides a mechanism to improve library services and at the same time to control costs through resource sharing and coordinated library computer development.
- More than $10,000,000 in library service computer expenditures will be returned to British Columbia from Ontario over the first five years' operations.
- Approximately thirty new jobs will be created in British Columbia to operate BCLN-DOBIS.

- Based upon responses to the Request for Information (RFI) the best computer upon which to build a data centre which will meet the requirements of BCLN is an IBM 4341 L01 with 4 megabytes of main memory. This computer has the capacity to support the projected members for cataloguing support services. To support additional acquisition and inter-library loan services would require a simple upgrade to an IBM 4341 M02 with 6 megabytes of main memory.

- The best disk storage system in terms of price/performance is the IBM 3380 subsystem with 20 gigabytes capacity. A satisfactory alternative is the CDC 33502 subsystem.

- It was originally planned that a Request for Proposals (RFP) would follow the RFI evaluation. As the IBM 4341 computer and IBM 3380 disk subsystem are clearly the best alternatives there would appear to be no purpose in following the RFP process for the data centre equipment.

- Several alternative Teleprocessing Network designs have been identified. Costs in each alternative are similar and all are feasible. There are relative advantages and disadvantages to each.

- None of the responses to the RFI proposed that a supplier put up any of the start-up costs of BCLN.

- None of the responses to the RFI proposed a service bureau approach to meeting the data centre and T.P. Network requirements. UBC library in its response suggested this as a possibility but was not in a position to make a firm commitment.

- Although a service bureau approach is considered preferable, the option of establishing a separate data centre to support BCLN is viable.

- The position of the B.C. Systems Corporation with regard to providing services for BCLN is not clear at this time. Without adversely delaying the implementation of BCLN it could be advantageous to keep open the opportunity for them to become involved.

- Ideally, the data centre would be located in the Greater Vancouver area. Regardless of site, the interests of the members of BCLN in total would be best served if the data centre was either owned and operated by a BCLN organization, or the data centre services were contracted with a supplier through a BCLN organization.

- Based upon the business case, costs at net present value over a 6 year period are lower if the data centre equipment is leased (on IBM's Government lease plan) and later purchased when purchase credits have reached the maximum than if the equipment is purchased initially. Also start-up costs are lower; $1,796,881 over the twelve-month start-up period.

- There is future potential for reducing data centre equipment costs by off-setting disk storage with the use of host-to-host communications between BCLN-DOBIS and the National Library DOBIS. At this time the National Library is reluctant to make any commitment to this arrangement because they are concerned about the impact on their computer resources. It is currently feasible for a BCLN user to access NL-DOBIS via Datapac (a commercial packet switched data network).

Recommendations

- Establish with an organization the responsibility for the establishment and operation of the B.C. Library Network. A grant of $1,796,881 would cover all start-up costs during the twelve-month start-up period. After

that point BCLN would be able to operate as an enterprise with revenue from services covering expenditures.

- Establish a data centre to support BCLN-DOBIS configured as follows:
  - IBM 4341 L01 4 Megabytes 6 Channels
  - 3380 disk subsystem with 20 gigabytes capacity
  - 6 x 3420 tape drives
  - 1 x 2501 card reader
  - 1 x 3203 printer
  - 1 x 3278 with 4632 operator console.

The data centre configuration was proposed in both of the leading proposals from the RFI and, had BCSC responded, would have probably been the same again.

- It is recommended that the data centre equipment is leased from IBM using the Government Lease Plan. When purchase credits have reached the maximum of 75% of the original purchase price, the equipment should then be purchased. Depending upon the required implementation date, delivery of the 3380 disk subsystem could be a problem, in which case one CDC 33502 subsystem, which is of comparative cost, should be considered.

- The data centre facility should be owned and operated by a BCLN organization, and the BCLN organization would ideally be located at a host institution.

. The selection of the teleprocessing network should not at this time be made.

To date, two viable network alternatives have been proposed, and it is possible that BCSC will shortly propose a third. All will be technically feasible and the costs of each will be similar. Furthermore, with the use of modelling aids available from IBM, the network can be configured to an optimum solution, and perhaps better sources of terminal and modem equipment can be identified with time. A critical path analysis has indicated that a decision on the network design need not be made until three months after the data centre equipment has been ordered.

The final selection of the T.P. Network should be made by the BCLN organization. An RFP process for the selection of terminal equipment and modems should be considered.

. BCSC should be given the opportunity to make a proposal to provide the T.P. Network support if they are able to do so within the implementation schedule time frame, i.e. within two months of the ordering of the data centre equipment.

The advantages that BCSC will probably be able to offer are

. network cost savings because of sharing of resources
. reduced costs for modems and terminals because of volume discounts
. the expertise to be able to develop the required interface between BCLN and the external networks (like Datapac). BCSC is in a much

better position to undertake such a development than is BCLN. The need for such an interface probably already exists within some of the Ministry users of BCSC.

Should BCSC end up providing the network support, the data centre configuration which would at that time be owned by BCLN could, on terms acceptable to both BCLN and BCSC be 'sold' to BCSC who would in turn charge the services back to BCLN.

It should be stressed, however, that at this time the decision to establish the data centre should be made without resolving the network design.

- Regardless of whether the BCLN computing facility is in-house or contracted, the application software support functions (data base administrator, application programmer analysts and data control) and library services functions (Authorities - Standards, Network Services and Librarian systems analysts) should be part of the BCLN organization.

- The BCLN organization should submit a formal request to the National Library to be set up as a user of NL-DOBIS with access via Datapac.

- A study should be undertaken to identify alternative methods whereby public and other libraries with mini-computer based systems can access and report holdings to the BCLN data base.

- A project should be undertaken to prepare detail design specifications (file and record layouts, sort sequences, program narratives, etc.) for the implementation Priority 1 tasks.

CONSULTING ASSIGNMENT BACKGROUND

Terms of Reference

. The original objectives were for the consultant to develop a report documenting the following:

- Implementation and operating costs, staffing requirements, technical and network information and recommendations for the implementation of BCLN-DCBIS
- information and recommendations regarding the selection of the appropriate computing facility requirement for the BCLN-DOBIS system
- a draft request for proposal (RFP) for the recommended facility requirements
- an implementation plan, schedule and detailed cost projections for start-up and operating costs.

Assignment History

. The project has been undertaken basically as outlined in the original project proposal developed by Systems West Consultants. The basic steps were as follows:

- Review and Clarify existing information
- Define evaluation criteria / performance requirements
- Issue Request for information
- Evaluate RFI response
- Assess impact of RFI response on cost estimates and implementation schedules
- Prepare final report including recommendations.

Other Studies and Reports

. The implementation tasks from the 'Data Base Load and User Requirements Study' have been incorporated into the implementation and start-up cost schedules.

. Several reports prepared by P. Baldwin, Project Manager have been incorporated

- BCLN Union File Growth Estimates
- Proposed BCLN Office Operating Expenditures
- Draft Estimate of Potential BCLN Revenue
- Additional Benefits of BCLN-DOBIS

. Numerous previous reports were reviewed, including:

- British Columbia Library Network, A Study of Feasibility
- The DOBIS and Washington Library Network Systems, A Comparison for BCLN
- Proposal to Fund the Establishment of a Computer Based Library Service Utility in B.C.
- B.C.U.C. Replication Study Design Phase 1 Plan Book
- DOBIS Evaluation Report for UNICAT/TELECAT
- DOBIS Evaluation Summary Report (National Library of Canada)
- DOBIS Capacity Planning (IBM)
- Various IBM technical manuals

HARDWARE & COMPUTING FACILITIES REQUIREMENTS

Hardware Evaluation Criteria

Hardware includes:

- the computer processing capability to support BCLN, i.e. main frame
- peripheral equipment such as disk and tape drives, channels, card readers and printers, etc. required to support the computer processing capability
- software to support the computer processing capability and peripheral equipment such as operating system and utilities and all required systems software products and languages (e.g. CICS, Assembler, PL/1)
- personnel to support the above hardware and software for both operating and maintenance.

Functional Requirements

Required Functions

The hardware will service an estimated 68 remote terminals which will be required to support the following on-line functions:

- Catalogue support with authorities control
- Acquisitions
- Inter-library loans

The section 'Teleprocessing Network Evaluation Criteria' provides details of terminal locations and transaction processing volumes. In addition the hardware will also support a background subfunction of the on-line DOBIS system called DMIN. This allows the on-line system to control concurrent sequential updating of the data base through the DMIN input while processing on-line transactions.

The hardware will support the following batch processing functions:

- Data base maintenance
- COM catalogue magnetic tape
- Catalogue cards
- Purchase orders
- Output interface tape

The NL-DOBIS system utilizes the following systems software products or languages:

- PL/1
- Assembler
- CICS
- BDAM

- OS/VS1 operating system and utilities
- BTAM

The BCLN-DOBIS hardware facility must be capable of either supporting the above, or of supporting a feasible alternative. Changes to the application software programs or data base structure should be avoided as the advantages of replicating the NL-DOBIS system would be negated.

Data Base Structure

The NL on-line DOBIS data base comprises nineteen separate physical files which can be categorized into two basic types:

- access point files. Initial access to the data base is via one of the nine access point files (e.g. author, title, subject). Associated with each entry in the access point files are pointers (relative disk addresses) to all the bibliographic data associated with that entry.
- document files. These files contain the descriptive bibliographic data including holdings and copies information.

The access method used to support the NL DOBIS data base structure is BDAM (Basic Direct Access Method). Retrieval of a record is by relative address within the file. This address can be that of a desired record or a starting point for sequential access. BDAM also provides addresses for available space for adding records.

Data Communications Structure

At NL DOBIS BTAM (Basic Telecommunications Access Method) controls the transmission of information between the terminals and the application software. Migration to VTAM is being considered.

The on-line application software is invoked by CICS (Customer Information Control System) which also provides specific device support.

Applications Software

NL-DOBIS contains 97 on-line programs and 41 batch programs which support the catalogue card, COM and report production.

All on-line programs are written in PL/1 or Assembler and are stored as load modules. CICS identifies the application program required to process the message, brings the load module into memory and initiates a task to execute the program and process the message.

DOBIS is a table-driven system (there are 300 user-defined maps and code tables in NL-DOBIS) and is designed to be tailored to individual user requirements. Changes can be made without modifying source programs as follows:

- adding a new dialogue language
- setting up the libraries of the network
- changing the contents of the code tables, which are 'included' in application program source code
- set the number of permutation languages and enter and change the stop-word lists
- change the subfield codes displayed for the user during entry of access-point files
- make other changes to screens displayed to the terminal user.

Utility Programs

Utilities are required to:

- load/unload the data base
- reorganize the data base
- provide statistics on the status of data base files
- test linkages
- journal transactions (performed by CICS at NL-DOBIS).

Cataloguing Workload

The annual cataloguing workload for BCUC members in the year ending March 1982 is expected to be 290,000 titles. Of these:

- 73,000 original titles
- 195,000 derived
- 32,000 updates

The impact of the workload upon the hardware facility is as follows:

- the volume of on-line transactions and terminals required is proportionate to the volume of titles added. The section 'Teleprocessing Network Evaluation Criteria' includes estimates of transaction volume and terminals required by library location;
- the amount of computer main memory to run DOBIS-CICS (or equivalent) is proportionate to the number of terminals supported;
- the amount of disk storage required for the data base is proportionate to the rate at which titles are added to the data base;
- the computer main memory resources required to process
  - Data Base Maintenance and COM catalogue magnetic tape is proportionate to the size of the data base;

- catalogue cards (average 5 per title), purchase orders and output interface tape is proportionate to the numbe of titles added.

Performance Requirements

The previous section described how cataloguig workload influences the level of computer resources required to support the operation of DOBIS, i.e. how much work the system is doing. The other aspect which determines the level of computer resources is the way in which the DOBIS computer system operates. This is a function of the way the system was designed to handle transactions and manifests itself in a utilization of computer and storage resources for each unit of transaction processing.

To obtain this characteristic data the operation of DOBIS was reviewed at two sites: National Library, Ottawa and Centennial College Bibliographic Centre, Toronto.

As it turned out, Centennial College did not have resource utilization data available, therefore most of this section refers to data from the National Library.

The data centre configurations of those two installation are as follows:

Centennial College

1. Hardware
   - main memory - IBM 370/148 2 Meg.
     operating system - OS/VS1 release 7 : takes 200k
   - tape drives : 3420-8 (6250 bpi)
   - disk drives : 3330S and 3350S.

2. Supporting Software

   - CICS - CICS/VS release 1.3., soon to be released 1.5 takes 1 Meg.
   - other products
     - PL/1, Assembler, Fortran, Cobol, SPM-online, SPMOL.

3. T.P. Network

   - communication lines : 4800 baud
   - control units : 3705 for remote terminals
   - CRT terminals - 3272 and 3274s for local : currently 28 will increase shortly to 50-60
     - 3277 and 3278 for remote through 3705
     - 3271 Controller at Ryerson handling 5 terminal devices
   - terminal printers - 2741 typewriter terminals for printing book cards and spine labels
     - 1403 for catalogue cards and bar code labels

     ALA print train used.

4. DOBIS Volumes

   - 400,000 titles in production data base, requires 800 Meg.
   - 1 million titles on source file, requires 1.5 gigs.
   - currently 5 colleges have remote dial-up access:
     - Ryerson
     - East York
     - Resource Centre
     - Progress Campus
     - Ashtenby

National Library

1. Hardware

   - main memory - IBM 3031 4 Meg (soon to be IBM 3032 6 Meg)

     partitioned as follows:

- Production DOBIS	3.5 Meg	virtual
Test DOBIS	1.5	
Batch partitions 2 x 1	2.0	
Batch partitions 3 x .5	1.5	
Batch partition 1 x 2	2.0	
Batch partition 1 x .25	.25	
ROSCOE	.2	

   - tape drives 8 x 6250 b.p.i.
   - disk drives 3350 compatible

2. Supporting Software

   - operating system OS/VS1 release 7
   - CICS/VS release 1.5
   - PL/1, Assembler, ROSCOE, BTAM.

3. T.P. Network

   1) Series 1 Minicomputer #1

      - 3 x 9600 baud lines : 1 supporting DOBIS, 1 TEST DOBIS and 1 ROSCOE
      - supports 24 x IBM 4978 CRTS and 2 x IBM 5974 terminal printers.

   2) Series 1 Minicomputers #2, 3, 4, and 5

      - each has 2 x 9600 baud lines supporting DOBIS
      - each supporting respectively - 17 x 4978 and 5 x 4974
        22 x 4978 and 3 x 4974
        23 x 4978 and 4 x 4974
        17 x 4978 and 1 x 4974

3) 11 Further 9600 baud lines, each supporting

- 1 x IBM 3276 CRT and 1 x IBM 3287 printer
- 6 x ALLCOM CRT's (one is controller) and 4 ALLCOM printers
- 1 x IBM 3276 Controller, 6 x IBM 3278 CRT's and 1 x IBM 3287 printer
- 1 x 3276, 1 x 3278 and 1 x 3287
- 1 x 3276, 1 x 3278 and 1 x 3287
- 1 x 3276, 3 x 3278 and 1 x 3287
- 1 x 3276, 3 x 3278 and 1 x 3287
- 1 x 3276 and 1 x 3287
- 1 x 3276, 1 x 3278 and 1 x 3287
- 1 x 3276 and 1 x 3287
- 1 x 3276 via DATAPAC

All above remote terminals are within a 10 mile radius of the host computer.

4) One local terminal - IBM 3275

5) Plans to add 3 more 9600 baud lines supporting 3 ALLCOM controllers, 27 terminals and 8 printers.

6) In total there are 20 x 9600 baud lines supporting 162 devices.

Main Memory Requirements

On-line Processing

The National Library estimates the memory requirements to run CICS supporting DOBIS to be:-

1088k + (23K x (number of terminals in use + 5))

where k = 1024 bytes of virtual memory. This estimate is purely to support CICS - DOBIS and does not include the operating system etc.

Based upon the estimated terminal requirement for BCLN of 68 the memory required would be 2767k.

BCLN-DOBIS will be required to be on-line between 7:30 a.m. and 6 p.m. Monday through Friday.

Performance of NL-DOBIS for November 1980 was analyzed.

- Two groups of on-line users were analyzed.
  - 7,406 titles were catalogued using 11 terminals
  - 324,877 messages (enters) were transmitted from the terminals to to the host
  - 18.127 hours of CPU were utilized by DOBIS on-line, including CICS
  - the average connect time per terminal for the month was 160 hours.
- For all users of the on-line system
  - data base contained 1.4 million titles
  - 19,095 titles catalogued
  - 3,176 CPU minutes
  - 18,801 elapsed minutes
  - 23,661 tape accesses
  - 741,063,000 tape traffic in bytes
  - 12,798,240 disk accesses
  - 30,566,566,000 disk traffic in bytes

On average, each title added resulted in 43.8 messages to the host, and at the host 9.98 CPU seconds and 670 disk I/Os.

During the month of November 1980, 106,928 titles were added using the DMIN (background updating under CICS input. The resulting resource

utilization was as follows:

CPU	1,521 minutes
disk accesses	15,792,877
disk traffic	28,152,349,840 bytes

Batch Processing

It is expected that the majority of the jobs to produce the output products and to support data base maintenance will be run after BCLN-DOBIS has been brought off-line during the evenings and week-ends.

Data Base Maintenance

At the end of each day when BCLN-DOBIS is brought off-line the entire data base will be backed up on to tape. This back-up is used when required to restore any of the files in the data base.

Also at the end of each day the day's journal of update transactions will be backed up to tape. The transaction journal tape is also used as required to restore data base files.

On occasion it becomes necessary to re-organize a data base file, for example if it approaches being full.

For the month of November 1980, which was considered to be an average month, the following computer resources were utilized to support data base maintenance functions:

- 1,074 CPU minutes
  11,553 elapsed minutes
  5,220,000 tape accesses
  144,760,689,000 tape traffic in bytes

- 20,892,923 disk accesses

  37,000,000,000 disk traffic in bytes

The need for high-speed tape drives is obvious. At the end of November the data base contained 1.5 million titles.

Output Products

COM Catalogue Magnetic Tape

Contains comprehensive bibliographic information including holdings for every title held in the data base. At the National Library, rather than extract the full data base each month on to tape, a tape file is retained for the next month and that month's updates are merged together.

Catalogue Cards

Are produced each night for each title added (average 5 cards per title) during the previous day. Access to library holdings information is commonly through the catalogue card file.

Purchase Orders

Are not yet produced at the National Library. A purchase order would be produced each night for each document ordered during the previous day.

Output Interface Tape

Would be produced on a weekly or monthly basis to provide input to member libraries with their own minicomputer systems. The tape would contain records added or changed since the last interface tape. It could probably be produced as a spin-off from the production of the COM tape.

For the month of November 1980 at NL-DOBIS to support the production of the COM tape and catalogue cards the following computer resources were utilized:

- 1,171 CPU minutes
  2,689 elapsed minutes
  110,909 tape accesses
  168,049 disk accesses
  490,515,088 tape traffic in bytes
  2,166,761,440 disk traffic in bytes

At the end of November the data base contained 1.5 million titles. During November 19,095 records were added on-line and 24,753 records were added off-line (DMIN).

Main Memory Utilization Summary

The following is a method based upon observations of NL-DOBIS of estimating CPU utilization (on the NL IBM 3031) and disk I/Os for BCLN-DOBIS.

To estimate CPU seconds for any given month

- (number of titles added on-line x 9.98) +
  (number of titles added DMIN x .86) +
  (number of titles added DMIN + on-line x 1.6) +
  (number of titles in data base x 0.05)

To estimate disk I/Os for any given month

- (number of titles added on-line x 670) +
  (number of titles added DMIN x 148) +
  (number of titles added DMIN + on-line x 3.8) +
  (number of titles in data base x 14.9)

For the month of April 1983 the data base is expected to contain 4.2 million records, there would be an estimated 26,500 titles added on-line and 23,000 titles added through DMIN(CAN MARC).

The resulting utilization would be 9,557.5 minutes CPU utilization and 84,000,000 disk I/Os.

Disk Storage Requirements

Disk storage is required for

- data base storage
- work areas, e.g. sort and data base reorganization
- source file storage and other libraries
- to support the operating system and software products

Data Base Storage Requirements

The BCLN-DOBIS data base will be made up of the following types of bibliographic records:

- those BCUC records converted from the existing computer system (UTLAS) and subsequent updates
- those source records obtained from the NL-DOBIS data base and subsequent updates
- those added as a result of the retrospective conversion project (RECON) for Public Libraries.

Estimates of the number of data base records by the above type were obtained from the document compiled by Paul Baldwin of BCUC entitled 'BCUC Proposed BCLN-DOBIS Computer Facility Workload Estimate Categories'.

The average space required for a complete (bibliographic, holdings, copies and access point files) logical record in DOBIS at the National Library in April 1979 was 1707.77 characters including all overheads.

The following should be noted:

- For source and BCUC records the estimate of 1707.77 characters per record is used
- For Recon records an estimate of 1200 characters per record is used
- The Recon project will commence September 1981 and be completed September 1982 with an even workload distribution
- For the Recon project
  - 1,091,200 records to be converted
  - of these it is estimated there are 364,850 (33%) unique records
  - of the unique records, 10% will overlap with BCUC records leaving 328,000 unique Recon records

The estimated size of the BCLN-DOBIS data base is estimated to be:

	BCUC	Source	Recon	Total Records	Characters 10^6 Disk Data Base
March 1981	900,000	1,700,000			
1982	1,020,000	2,500,000	164,000	3,684,000	6,208
1983	1,140,000	2,750,000	328,000	4,218,000	7,037
1984	1,260,000	3,010,000	328,000	4,598,000	7,686
1985	1,380,000	3,311,000	328,000	5,019,000	8,405

Work Areas

The National Library found it necessary to re-organize the DOBIS data base using disk work space because tape was too slow. Accordingly, BCLN-DOBIS would require disk work area equal to the size of the data base.

Other Disk Storage

In comparison with data base and work area space requirements, other requirements for disk storage are small.

TELEPROCESSING NETWORK EVALUATION CRITERIA

This category includes:

- the communications lines
- the CRT terminals and remote printers in the library locations
- all equipment required to support the T.P. Network including modems and control units
- communications software (e.g. protocol)
- personnel to support the above equipment and software for both operating and maintenance.

Functional Requirements

The network will service an estimated 68 remote terminals which will be required to support the following on-line DOBIS functions:

- catalogue support with authorities control
- acquisitions
- inter-library loans

In addition, users of BCLN-DOBIS must have access through the same terminal to NL-DOBIS in Ottawa and to other library systems in North America (currently three systems are accessed through Datapac via the UBC Library computer: CAN/OLE, DIALOG and ORBIT).

Responsiveness

Three seconds is considered to be the maximum acceptable response time at a terminal, i.e. the time between hitting enter and the first character of the return message appearing on the screen.

Performance Requirements

Terminal Requirements

Based upon workload estimates, it is considered that the following CRT terminals are required by location to support the Cataloguing, Acquisitions and ILL functions. The requirement for terminal printers has not at this time been determined.

Simon Fraser University	6
U.B.C.	12
University of Victoria	6
B.C.I.T. (Burnaby)	2
Camosun College (Victoria)	1
Capilano College (North Van)	1
Cariboo College (Kamloops)	1
Douglas College (Richmond)	2
David Thompson Univ. Centre (Nelson)	2
East Kootenay College (Cranbrook)	1
Fraser Valley College (Abbotsford)	1
Justice Institute (Vancouver)	1
Malaspina College (Nanaimo)	1
College of New Caledonia (Pr. George)	1
Northern Lights College (Dawson Creek)	1
Northwest College (Terrace)	1
Okanagan College (Kelowna)	1
* Open Learning Inst. (Richmond)	
* Pacific Vocational Inst. (Burnaby)	1
# Selkirk College (Castlegar)	
Vancouver Comm. College (Vancouver)	4
Burnaby Public Library	2
Greater Victoria Public Library	4
Richmond Public Library	2
Legislative Lib. of B.C. (Victoria)	2
* Ministry of Educ. Lib. (Victoria)	
Vancouver Special Libraries (Vancouver)	1
New Westminster Public Library	2
North Vancouver City Library	1
North Vancouver District Library	1
Port Moody Public Library	1
Vancouver Public Library	4
West Vancouver Memorial Library	2

*Contract for cataloguing Support to a Consulting bureau in North Vancouver.

#Shares with David Thompson University.

Transaction Volumes

Transactions are defined here as the transmittal of messages between the user at a terminal and the host computer. Each time the enter key is depressed, a transaction is transmitted to the host. Each transaction consists of a varying number of characters being transmitted from the terminal to the host and will result in a reply, again of a varying number of characters being transmitted from the host back to the terminal.

The National Library DOBIS project group developed an estimating model back in 1977 which predicted the range of volume of transactions which would be generated when the following functions were performed:

- original cataloguing
- derived cataloguing
- catalogue updating
- search only

With information provided by IBM, Systems West expanded this model to predict the number of characters out of a terminal and into a terminal associated with those functions. In addition the model was expanded to include the acquisition function.

As part of a site-visit to the National Library, the model was tested against the workload during the month of November 1980 for the CISTI and Library of Parliament users and the volume of transactions generated at all the terminal locations for those users. Some modifications were made as a result of the test.

The final version of the model and as used in developing the estimates of the RFI is as follows:

Function	Transactions Generated	Characters out of Terminal	Characters out to Terminal
Original cataloguing (per document)	112-185	1,633-2,722	44,010-73,500
Derived cataloguing	39-60	398-680	19,700-30,300
Catalogue updating	20	245	9,900
Search only	9	185	7,500
Acquisitions	30-42	4380612	11,800-16,500
ILL (search only)	9	185	7,500

It should be noted that:

- the National Library does not have statistics on the volume of characters passing between the terminal locations and the host computer, therefore character estimates are untested
- the National Library is not using the acquisition function therefore estimates of this function are untested
- acquisition estimates are based upon the ordering and receiving sub-functions being performed for each new document. A nominal overhead per document for the other sub-functions is built in to the estimate.

The following table of cataloguing workload for 1981/82 by library was taken from the document 'BCUC Proposed BCLN-DOBIS Computer Facility Workload Estimate Categories'.

Simon Fraser University	20,000
UBC	60,000
University of Victoria	30,000
BCIT (Burnaby)	10,000
Camosun College (Victoria)	5,000
Capilano College (North Vancouver)	6,000
Cariboo College (Kamloops)	4,000
Douglas College (Richmond)	12,000
David Thompson U. Centre (Nelson)	6,000
East Kootenay College (Cranbrook)	2,000
Fraser Valley College (Abbotsford)	2,000
Justice Institute (Vancouver)	2,000
Malaspina College (Nanaimo)	4,000
College of New Caledonia (Pr. George)	6,000
Northern Lights College (Dawson Creek)	3,500
Northwest College (Terrace)	5,000
Okanagan College (Kelowna)	4,000
Open Learning Inst. (Richmond)	500
Pacific Vocational Inst. (Burnaby)	2,000
Selkirk College (Castlegar)	3,500
Vancouver Comm. College (Vancouver)	12,000
Burnaby Public Library	8,000
Greater Victoria Library	12,000
Richmond Public Library	8,000
Legislative Lib. of B.C. (Victoria)	4,500
Ministry of Educ. Lib. (Victoria)	500
Vancouver Special Libraries (Vancouver)	3,000

This table of cataloguing workload was applied against the final version of the model to produce the following tables:

- for each on-line function: update, derived, original and all cataloguing, acquisitions and search only
- each table shows for each location, characters out and in for
  - average monthly volume
  - peak monthly volume
  - peak hourly volume

Regarding the tables, the following should be noted:

- for the university libraries, the make-up of a typical cataloguing workload is expected to be:
  - original 41%
  - derived 9%
  - update 50%

- for the college libraries, the make-up is expected to be:
  - original 17%
  - derived 11%
  - update 72%
- for public libraries:
  - original 12.5%
  - derived 12.5%
  - update 75%
- during a peak month, workload would represent 20% of the annual workload
- an average of 22 working days per month is assumed
- estimates are based upon a projected 1981/82 workload. It is expected that workload would increase in each subsequent year by 10%.
- workload estimates for the ILL function are based upon a BCUC estimate of 250,000 searches over all libraries during the first year of operation of the BCLN. This number was then broken down by individual library.

FUNCTION: CATALOGUING - ORIGINAL

Library	Monthly Average 10^6 Characters		Peak Month 10^6 Characters		Peak Hour 10^6 Characters	
	Out	In	Out	In	Out	In
Simon Fraser University	1.52	41.12	4.57	123.48	0.042	1.12
U.B.C.	4.56	123.36	13.71	370.44	0.125	3.37
University of Victoria	2.28	61.68	6.86	185.22	0.063	1.69
B.C.I.T. (Burnaby)	0.76	20.56	2.29	61.74	0.021	0.56
Camosun College (Victoria	0.38	10.28	1.15	30.87	0.011	0.28
Capilano College (North Van)	0.46	12.34	1.37	37.04	0.012	0.34
Cariboo College (Kamloops)	0.30	8.22	0.91	24.70	0.008	0.22
Douglas College (Richmond)	0.90	24.66	2.74	74.08	0.024	0.68
David Thompson Univ. Centre (Nelson)	0.46	12.34	1.37	37.04	0.012	0.34
East Kootenay College (Cranbrook)	0.15	4.11	0.46	12.35	0.004	0.11
Fraser Valley College (Abbotsford)	0.15	4.11	0.46	12.35	0.004	0.11
Justice Institute (Vancouver)	0.15	4.11	0.46	12.35	0.004	0.11
Malaspina College (Nanaimo)	0.30	8.22	0.91	24.70	0.008	0.22
College of New Caledonia (Pr. George)	0.46	12.34	1.37	37.04	0.012	0.34
Northern Lights College (Dawson Creek)	0.26	7.19	0.81	21.61	0.007	0.19
Northwest College (Terrace)	0.38	10.28	1.15	30.87	0.011	0.28
Okanagan College (Kelowna)	0.30	8.22	0.91	24.70	0.008	0.22
Open Learning Inst. (Richmond)	0.03	1.03	0.12	3.09	0.001	0.03
Pacific Vocational Inst. (Burnaby)	0.15	4.11	0.46	12.35	0.004	0.11
Selkirk College (Castlegar)	0.26	7.19	0.81	21.61	0.007	0.19
Vancouver Comm. College (Vancouver)	0.90	24.66	2.74	74.08	0.024	0.68
Burnaby Public Library	0.61	16.45	1.83	49.39	0.017	0.45
Greater Victoria Public Library	0.92	24.68	2.74	74.08	0.024	0.68
Richmond Public Library	0.61	16.45	1.83	49.39	0.017	0.45
Legislative Lib. of B.C. (Victoria)	0.33	9.25	1.03	27.78	0.009	0.25
Ministry of Educ. Lib (Victoria)	0.03	1.03	0.12	3.09	0.001	0.03
Vancouver Special Libraries (Vancouver)	0.23	6.17	0.81	21.61	0.007	0.19
New Westminster Public Library	0.57	15.42	1.72	46.31	0.016	0.42
North Vancouver City Library	0.42	11.31	1.26	33.96	0.012	0.31
North Vancouver District Library	0.40	10.90	1.21	32.73	0.012	0.30
Port Moody Public Library	0.22	5.96	0.66	17.91	0.006	0.16
Vancouver Public Library	1.52	41.12	4.57	123.48	0.042	1.12
West Vancouver Mem. Library	0.84	22.62	2.51	67.91	0.023	0.62

FUNCTION: CATALOGUING - DERIVED

Library	Monthly Average 10^6 Characters		Peak Month 10^6 Characters		Peak Hour 10^6 Characters	
	Out	In	Out	In	Out	In
Simon Fraser University	0.23	10.83	0.71	31.51	0.0064	0.286
U.B.C.	0.70	32.50	2.12	94.53	0.0193	0.859
University of Victoria	0.35	16.25	1.06	47.27	0.0097	0.429
B.C.I.T. (Burnaby)	0.12	5.42	0.36	15.71	0.0032	0.143
Camosun College (Victoria)	0.06	2.71	0.18	7.86	0.0016	0.072
Capilano College (North Van)	0.07	3.25	0.21	9.45	0.0019	0.086
Cariboo College (Kamloops)	0.046	2.17	0.14	6.30	0.0013	0.057
Douglas College (Richmond)	0.14	6.50	0.42	18.91	0.0038	0.172
David Thompson Univ. Centre (Nelson)	0.07	3.25	0.21	9.45	0.0019	0.086
East Kootenay College (Cranbrook)	0.02	1.08	0.07	3.15	0.0006	0.029
Fraser Valley College (Abbotsford)	0.02	1.08	0.07	3.15	0.0006	0.029
Justice Institute (Vancouver)	0.02	1.08	0.07	3.15	0.0006	0.029
Malaspina College (Nanaimo)	0.04	2.16	0.14	6.30	0.0012	0.058
College of New Caledonia (Prince George)	0.07	3.25	0.21	9.45	0.0019	0.086
Northern Lights College (Dawson Creek)	0.04	1.90	0.12	5.51	0.0011	0.050
Northwest College (Terrace)	0.06	2.71	0.18	7.86	0.0016	0.072
Okanagan College (Kelowna)	0.04	2.16	0.14	6.30	0.0012	0.058
Open Learning Inst. (Richmond)	0.006	0.27	0.018	0.79	0.0002	0.007
Pacific Vocational Inst. (Burnaby)	0.02	1.08	0.07	3.15	0.0006	0.029
Selkirk College (Castlegar)	0.04	1.90	0.12	5.51	0.0011	0.050
Vancouver Comm. College (Vancouver)	0.14	6.50	0.42	18.91	0.0038	0.172
Burnaby Public Library	0.09	4.33	0.28	12.60	0.0026	0.114
Greater Victoria Public Library	0.14	6.50	0.43	18.91	0.0038	0.172
Richmond Public Library	0.09	4.33	0.28	12.60	0.0026	0.114
Legislative Lib. of B.C. (Victoria)	0.05	2.44	0.16	7.09	0.0014	0.064
Ministry of Educ. Lib. (Victoria)	0.006	0.27	0.018	0.79	0.0002	0.007
Vancouver Special Libraries (Vancouver)	0.035	1.63	0.107	4.73	0.0009	0.043
New Westminster Public Library	0.086	4.06	0.266	11.82	0.0024	0.107
North Vancouver City Library	0.063	2.98	0.196	8.67	0.0018	0.079
North Vancouver District Library	0.061	2.87	0.188	8.35	0.0017	0.076
Port Moody Public Library	0.033	1.57	0.103	4.57	0.0009	0.041
Vancouver Public Library	0.23	10.83	0.71	31.51	0.0064	0.286
West Vancouver Memorial Library	0.127	5.96	0.39	17.33	0.0035	0.157

FUNCTION: CATALOGUING - UPDATE

Library	Monthly Average 10^6 Characters		Peak Month 10^6 Characters		Peak Hour 10^6 Characters	
	Out	In	Out	In	Out	In
Simon Fraser University	0.13	5.28	0.314	12.67	0.0029	0.115
U.B.C.	0.39	15.84	0.941	38.02	0.0086	0.346
University of Victoria	0.20	7.92	0.471	19.01	0.0043	0.173
B.C.I.T. (Burnaby)	0.07	2.64	0.157	6.34	0.0024	0.082
Camosun College (Victoria)	0.03	1.32	0.078	3.17	0.0007	0.029
Capilano College (North Van.)	0.04	1.58	0.094	3.80	0.0009	0.035
Cariboo College (Kamloops)	0.03	1.06	0.063	2.53	0.0006	0.023
Douglas College (Richmond)	0.08	3.17	0.188	7.61	0.0017	0.069
David Thompson Univ. Centre (Nelson)	0.04	1.58	0.094	3.80	0.0009	0.035
East Kootenay College (Cranbrook)	0.01	0.53	0.031	1.27	0.0003	0.012
Fraser Valley College (Abbotsford)	0.01	0.53	0.031	1.27	0.0003	0.012
Justice Institute (Vancouver)	0.01	0.53	0.031	1.27	0.0003	0.012
Malaspina College (Nanaimo)	0.03	1.06	0.063	2.53	0.0006	0.023
College of New Caledonia (Prince George)	0.04	1.58	0.094	3.80	0.0009	0.035
Northern Lights College (Dawson Creek)	0.02	0.92	0.055	2.22	0.0005	0.020
Northwest College (Terrace)	0.03	1.32	0.078	3.17	0.0007	0.029
Okanagan College (Kelowna)	0.03	1.06	0.063	2.53	0.0006	0.023
Open Learning Inst. (Richmond)	0.003	0.13	0.008	0.32	0.00007	0.003
Pacific Vocational Inst. (Burnaby)	0.01	0.53	0.031	1.27	0.0003	0.012
Selkirk College (Castlegar)	0.02	0.92	0.055	2.22	0.0005	0.020
Vancouver Comm. College (Vancouver)	0.08	3.17	0.188	7.61	0.0017	0.069
Burnaby Public Library	0.05	2.11	0.126	5.07	0.0011	0.046
Greater Victoria Public Library	0.08	3.17	0.188	7.61	0.0017	0.069
Richmond Public Library	0.05	2.11	0.125	5.07	0.0011	0.046
Legislative Lib. of B.C. (Victoria)	0.03	1.06	0.063	2.53	0.0006	0.023
Ministry of Educ. Lib. (Victoria)	0.003	0.13	0.008	0.32	0.00007	0.003
Vancouver Special Libraries (Vancouver)	0.02	0.79	0.047	1.90	0.0004	0.017
New Westminster Public Library	0.05	1.98	0.118	4.75	0.0011	0.043
North Vancouver City Library	0.04	1.45	0.086	3.48	0.0008	0.032
North Vancouver District Library	0.03	1.40	0.083	3.36	0.0008	0.030
Port Moody Public Library	0.02	0.77	0.046	1.84	0.0004	0.017
Vancouver Public Library	0.13	5.28	0.314	12.67	0.0029	0.115
West Vancouver Memorial Library	0.07	2.90	0.173	6.97	0.0016	0.063

FUNCTION: CATALOGUING - ALL

Library	Monthly Average 10^6 Characters Out	Monthly Average 10^6 Characters In	Peak Month 10^6 Characters Out	Peak Month 10^6 Characters In	Peak Hour 10^6 Characters Out	Peak Hour 10^6 Characters In
Simon Fraser University	1.88	57.23	5.594	167.66	0.0513	1.521
U.B.C.	5.65	171.7	16.771	502.99	0.1529	4.575
University of Victoria	2.83	85.85	7.920	251.50	0.077	2.292
B.C.I.T. (Burnaby)	0.95	28.62	2.807	83.79	0.0266	0.785
Camosun College (Victoria)	0.47	14.31	1.408	41.90	0.0133	0.381
Capilano College (North Van)	0.57	17.17	1.674	50.29	0.0148	0.461
Cariboo College (Kamloops)	0.376	11.45	1.113	33.53	0.0099	0.300
Douglas College (Richmond)	1.12	34.33	3.348	100.60	0.0295	0.921
David Thompson Univ. Centre (Nelson)	0.57	17.17	1.674	50.29	0.0148	0.461
East Kootenay College (Cranbrook)	0.18	5.72	0.561	16.77	0.0049	0.151
Fraser Valley College (Abbotsford)	0.18	5.72	0.561	16.77	0.0049	0.151
Justice Institute (Vancouver)	0.18	5.72	0.561	16.77	0.0049	0.151
Malaspina College (Nanaimo)	0.37	11.44	1.113	33.53	0.0098	0.301
College of New Caledonia (Prince George)	0.57	17.17	1.674	50.29	0.0148	0.461
Northern Lights College (Dawson Creek)	0.32	10.01	0.985	29.34	0.0086	0.260
Northwest College (Terrace)	0.47	14.31	1.408	41.90	0.0133	0.381
Okanagan College (Kelowna)	0.37	11.44	1.113	33.53	0.0098	0.301
Open Learning Inst. (Richmond)	0.039	1.43	0.146	4.20	0.00127	0.040
Pacific Vocational Inst. (Burnaby)	0.18	5.72	0.561	16.77	0.0049	0.151
Selkirk College (Castlegar)	0.32	10.01	0.985	29.34	0.0086	0.260
Vancouver Comm. College (Vancouver)	1.12	34.33	3.348	100.60	0.0295	0.921
Burnaby Public Library	0.75	22.89	2.236	67.06	0.0207	0.610
Greater Victoria Public Library	1.14	34.35	3.358	100.60	0.0295	0.921
Richmond Public Library	0.75	22.89	2.235	67.06	0.0207	0.610
Legislative Lib. of B.C. (Victoria)	0.41	12.75	1.253	37.40	0.011	0.337
Ministry of Educ. Lib. (Victoria)	0.039	1.43	0.146	4.20	0.00127	0.040
Vancouver Special Libraries (Vancouver)	0.285	8.59	0.964	28.24	0.0083	0.250
New Westminster Public Library	0.706	21.46	2.104	62.88	0.0195	0.570
North Vancouver City Library	0.523	15.74	1.542	46.11	0.0146	0.421
North Vancouver District Library	0.491	15.17	1.411	44.44	0.0145	0.406
Port Moody Public Library	0.273	8.30	0.809	24.32	0.0073	0.218
Vancouver Public Library	1.88	57.23	5.594	167.66	0.0513	1.521
West Vancouver Memorial Library	1.037	31.48	3.073	92.21	0.0281	0.840

FUNCTION: ACQUISITIONS

Library	Monthly Average 10^6 Characters Out	Monthly Average 10^6 Characters In	Peak Month 10^6 Characters Out	Peak Month 10^6 Characters In	Peak Hour 10^6 Characters Out	Peak Hour 10^6 Characters In
Simon Simon Fraser University	.88	23.58	2.45	66.00	0.022	0.600
U.B.C.	2.63	70.75	7.34	198.00	0.067	1.800
University of Victoria	1.32	35.38	3.67	99.00	0.034	0.900
B.C.I.T. (Burnaby)	0.44	11.79	1.23	33.00	0.011	0.300
Camosun College (Victoria)	0.22	5.90	0.61	16.50	0.006	0.150
Capilano College (North Van)	0.26	7.08	0.73	19.80	0.007	0.180
Cariboo College (Kamloops)	0.18	4.72	0.49	13.20	0.004	0.120
Douglas College (Richmond)	0.53	14.15	1.47	39.60	0.013	0.360
David Thompson Univ. Centre (Nelson)	0.26	7.08	0.73	19.80	0.007	0.180
East Kootenay College (Cranbrook)	0.09	2.36	0.25	6.60	0.002	0.060
Fraser Valley College (Abbotsford)	0.09	2.36	0.25	6.60	0.002	0.060
Justice Institute (Vancouver)	0.09	2.36	0.25	6.60	0.002	0.060
Malaspina College (Nanaimo)	0.18	4.72	0.49	13.20	0.004	0.120
College of New Caledonia (Prince George)	0.26	7.08	0.73	19.80	0.007	0.180
Northern Lights College (Dawson Creek)	0.15	4.13	0.43	11.55	0.004	0.105
Northwest College (Terrace)	0.22	5.90	0.61	16.50	0.006	0.150
Okanagan College (Kelowna)	0.18	4.72	0.49	13.20	0.004	0.120
Open Learning Inst. (Richmond)	0.02	0.59	0.06	1.65	0.0006	0.015
Pacific Vocational Inst. (Burnaby)	0.09	2.36	0.25	6.60	0.002	0.060
Selkirk College (Castlegar)	0.15	4.13	0.43	11.55	0.004	0.105
Vancouver Comm. College (Vancouver)	0.53	14.15	1.47	39.60	0.013	0.360
Burnaby Public Library	0.35	9.43	0.98	26.40	0.009	0.240
Greater Victoria Public Library	0.53	14.15	1.47	39.60	0.013	0.360
Richmond Public Library	0.35	9.43	0.98	26.40	0.009	0.240
Legislative Lib. of B.C. (Victoria)	0.20	5.31	0.55	14.85	0.005	0.135
Ministry of Educ. Lib. (Victoria)	0.02	0.59	0.06	1.65	0.0006	0.015
Vancouver Special Libraries (Vancouver)	0.13	3.54	0.37	9.90	0.003	0.090
New Westminster Public Library	0.33	8.84	0.92	24.75	0.008	0.225
North Vancouver City Library	0.24	6.49	0.67	18.15	0.006	0.165
North Vancouver District Library	0.23	6.25	0.60	17.49	0.006	0.159
Port Moody Public Library	0.13	3.42	0.3	9.57	0.003	0.087
Vancouver Public Library	0.88	23.58	2.45	66.00	0.022	0.600
West Vancouver Memorial Library	0.48	12.97	1.35	36.30	0.012	0.330

FUNCTION: SEARCH ONLY (ILL)

Library	Monthly Average 10^6 Characters Out	Monthly Average 10^6 Characters In	Peak Month 10^6 Characters Out	Peak Month 10^6 Characters In	Peak Hour 10^6 Characters Out	Peak Hour 10^6 Characters In
Simon Fraser University	.32	13.03	.77	31.28	.0073	.298
U.B.C.	.97	39.10	2.32	93.85	.0220	.894
University of Victoria	.48	19.55	1.16	46.93	.0110	.447
B.C.I.T. (Burnaby)	.16	6.52	.39	15.64	.0037	.149
Camosun College (Victoria)	.08	3.27	.20	7.82	.0019	.075
Capilano College (North Van.)	.10	3.91	.23	9.39	.0022	.089
Cariboo College (Kamloops)	.06	2.61	.15	6.26	.0015	.050
Douglas College (Richmond)	.19	7.82	.46	18.77	.0044	.179
David Thompson Univ. Centre (Nelson)	.10	3.91	.23	9.39	.0022	.089
East Kootenay College (Cranbrook)	.03	1.30	.08	3.13	.0007	.030
Fraser Valley College (Abbotsford)	.03	1.30	.08	3.13	.0007	.030
Justice Institute (Vancouver)	.03	1.30	.08	3.13	.0007	.030
Malaspina College (Nanaimo)	.06	2.61	.15	6.26	.0015	.060
College of New Caledonia (Pr. George)	.10	3.91	.23	9.39	.0022	.089
Northern Lights College (Dawson Creek)	.06	2.28	.14	5.47	.0013	.052
Northwest College (Terrace)	.08	3.27	.20	7.82	.0019	.075
Okanagan College (Kelowna)	.06	2.61	.15	6.26	.0015	.060
Open Learning Inst. (Richmond)	.008	.33	.02	.78	.0002	.008
Pacific Vocational Inst. (Burnaby)	.03	1.30	.08	3.13	.0007	.030
Selkirk College (Castlegar)	.06	2.28	.14	5.47	.0013	.052
Vancouver Comm. College (Vancouver)	.19	7.82	.46	18.77	.0044	.179
Burnaby Public Library	.13	5.21	.31	12.51	.0029	.119
Greater Victoria Public Library	.19	7.82	.46	18.77	.0044	.179
Richmond Public Library	.13	5.21	.31	12.51	.0029	.119
Legislative Lib. of B.C.(Victoria)	.07	2.93	.17	7.04	.0017	.067
Ministry of Educ.Lib.(Victoria)	.008	.33	.02	.78	.0002	.008
Vancouver Special Libraries (Vancouver)	.049	1.96	.12	4.69	.0011	.045
New Westminster Public Library	.121	4.89	.29	11.73	.0028	.112
North Vancouver City Library	.089	3.58	.21	8.60	.0020	.082
North Vancouver Dist.Library	.086	3.45	.20	8.29	.0019	.079
Port Moody Public Library	.047	1.89	.11	4.54	.0011	.043
Vancouver Public Library	.32	13.03	.77	31.28	.0073	.298
West Vancouver Memorial Library	.18	7.17	.43	17.21	.0040	.164

SOFTWARE SUPPORT EVALUATION CRITERIA

This category includes:

- Data Control
- Data Base Administration
- Application Software maintenance and enhancements

Functional Requirements

- Data Control
  - troubleshooting
  - interface between the user and computing facility
  - job scheduling and submission
- Data Base Administration
  - maintain data dictionary
  - ensuring the integrity of the physical data base
  - monitor growth and capacity
  - back-up and reorganization
  - security
  - control access to data base
  - initiation of DOBIS on-line
- Application software maintenance
  - implement new software releases
  - change application software
  - keep application software running
  - maintain test versions of software and data bases

- Application software enhancements
  - definition of user requirements
  - liaise with systems librarians

Performance Requirements

Data Control

- must be a centralized function liaising with all user locations
- requires a designated contact in each user area
- must be familiar with the BCLN-DOBIS processing requirements of users
- must be able to effectively liaise with the computing facility in setting schedules, submitting jobs and resolving problems
- requires two-shift support: day and evening

Data Base Administration

- must be totally familiar with the data base structure of BCLN-DOBIS and how the data base interfaces with the application software.
- must be technically proficient in the hardware and systems software products used to support BCLN-DOBIS
- requires the implementation of standards and procedures to ensure the integrity of the physical data base at all times
- requires day-shift support with on-call support at all times BCLN-DOBIS is operating on-line.

Application Software Maintenance

- must have a high level of proficiency in PL/1 and Assembler programming languages
- must be familiar with library operations
- must be technically proficient in the hardware and systems software products

used to support BCLN-DOBIS

- must be familiar with the BCLN-DOBIS application software and data base structure
- requires day-shift support with on-call support for critical production runs.

Application Software Enhancements

- must have a high level of knowledge of library operations. Background in a library position is desirable.
- must be familiar with the BCLN-DOBIS application software and data base structure
- must be familiar with systems analysis techniques
- must be able to effectively work with users to determine user requirements.

EVALUATION OF SHARED VERSUS DEDICATED COMPUTER FACILITIES

Several alternative sources of computer facility service are available to BCLN:

- an in-house dedicated facility
- a contracted dedicated facility
- a contracted shared facility

The merits and drawbacks of each are discussed individually.

In-house Dedicated Facility

The advantages BCLN would realize in establishing its own computing facility are:

- BCLN would be able to exercise absolute control over the operation of the facility
- any profit made by a contractor is eliminated

The disadvantages are:

- the price/performance of computing equipment has dropped dramatically in recent years and is expected to continue to drop. An in-house facility, because of its size, may be limited in its ability to take advantage of new technology.
- the management and operation of a computing facility is a complex job and would depend upon professional management and top quality technicians. Not only are such individuals hard to find, but also when on staff would require the provision of back-up (for sickness and vacation) and training.
- arrangements for a suitable computing facility back-up would have to be made.

Contracted Facility

The merits and drawbacks of a contracted computing facility (regardless of whether dedicated or shared) are discussed.

The advantages BCLN would realize in contracting for computer facility service are:

- BCLN would be buying a service. It becomes the responsibility of the contractor to worry about such headaches as back-up, recruiting and training staff, scheduling down-time, and upgrading to new technology.
- A contractor would be able to take advantage of economics of scale; price reductions for volume, overhead and support services. In order for BCLN to benefit obviously savings would have to be passed back.

The disadvantages are:

- because a contractor is servicing a number of users, there may be occasions when the service to BCLN was not as responsive as required
- unless the contractor is working on a break-even basis (Government institutions such as BCSC and the Universities may be) then a profit margin for the contractor is funded by BCLN and other users.
- the use of a contractor may demand that BCLN places more emphasis on scheduling and forward planning. This is not necessarily a disadvantage.

Contracted Dedicated Facility

A computer facility dedicated to BCLN but owned and operated by a contractor and charged back to BCLN.

The advantage of this method is that the facility would be as responsive as an in-house facility, but with the advantages of a Contracted Facility.

The disadvantage depends upon the nature of the contractor. If the organization is large enough then it should still be possible to realize the advantages of a contracted facility. If the organization is smaller, then economies of scale may not be a factor.

Contracted Shared Facility

A computer facility, shared by BCLN and other users (i.e. time sharing), owned and operated by a contractor.

There are not other advantages or disadvantages over and above those listed for a contracted facility.

Summary

The question is resolved by considering each alternative.

- the ability of each facility to meet the requirements of BCLN in terms of performance and throughput and to provide adequate back-up
- cost comparisons
- realization of advantages and avoidance of disadvantages as laid out earlier.

RFI Evaluation

Several potential contractors had expressed interest in providing computer facility service

- Simon Fraser University Computing Centre
- U.B.C. Library Processing Centre
- B.C. Systems Corporation

Also to be considered are service bureaux in the private sector.

The Request for Information was forwarded to those institutions above and to selected vendors in the private sector.

Objectives of the Request for Information

The RFI process and subsequent responses are intended to serve the following purposes:

- to document the requirements of the BCLN in terms of hardware and computing facilities
- based upon cost information in the responses, to provide firm estimates of start-up and operating costs of the BCLN in terms of hardware and computing facilities
- based upon suggested solutions in the responses, to assist in the design of the BCLN in terms of hardware and computing facilities by resolving such issues as:
  - central versus distributed hardware
  - dedicated versus shared hardware and computing facilities
  - in-house versus contracted data centre
  - in-house versus contracted application software support
  - optimum method of chargeback of hardware and computing facility costs.
- to serve as a screening process, to be followed, at a later date, by a Request for Proposals (RFP) to a short-list of selected suppliers.

RFI Response Summary

The following proposals were received.

1. IBM Canada Ltd.

   A comprehensive proposal designed to meet the requirements of BCLN-DOBIS in terms of the hardware computing facility and teleprocessing network.

2. UBC Library

   A comprehensive proposal which recommended a hardware computing facility basically the same as the solution offered by IBM, but with an alternative teleprocessing network design.

3. Sperry Univac

   A comprehensive proposal which recommended their 1100/60 series computer as the principal hardware with a smaller computer, a V/77 operating as a front-end communications controller. Requirements for the teleprocessing network were addressed by proposing Univac terminals and multiplexors. A requirement of this proposal is that the DOBIS application software and data bases would have to be converted or re-written to a format acceptable to the manufacturer. Despite the high capability of the equipment and system software proposed, to re-write or convert the NL-DOBIS application software and data bases would be inconsistent with the objective of replication and would not realize the expected advantages of replicating the National Library System (such as the sharing of resources for system improvement). For these reasons this proposal should be screened out.

4. Simon Fraser University Computing Centre

   A brief proposal which offered the services of an IBM 370/148 computer for use in the systems implementation phase, and also expressed an interest

in providing the hardware and teleprocessing network facilities for BCLN-DOBIS.

5. Control Data Canada Ltd.

   Control Data is a corporation which specializes in IBM plug-compatible equipment and proposed their 33502 disk subsystems and 32111-2 printer as alternatives to IBM.

6. CNCP Telecommunications

   Offering an outline proposal to the teleprocessing network.

7. B.C. Systems Corporation

   Because of major commitments to other Government ministries, B.C.S.C. was unable at this time to respond, but held open the possibility that at a future time when their ability to meet their commitments is better known they may be in a position to meet the requirements of BCLN-DOBIS.

The two stand-out proposals are those from IBM and UBC Library and these are described further.

IBM PROPOSAL

SUMMARY

Ability to meet requirements

- The hardware configuration proposed consists of a 4341 M02 computer with 6 megabytes of memory and 6 channels, the 3380 disk system and 3420 tape drives. This is considered more than adequate for the job.

- The terminals proposed are of the 8775 and 327X series. These again are adquate. It should be noted that the 327X series terminals do not provide the full library character set, but require a translation table which is already in the NL-DOBIS system.

- The network is based upon 9 x 9600 baud lines full-duplex with 40 x 9600 baud modems. The configuration will be responsive, 90% of all enters should receive a response within 3 seconds, based upon IBM modelling tools.

- The interface with external networks (like Datapac) would be difficult to develop, even with assistance from IBM. Because IBM has proposed SNA (Systems Network Architecture) hardware and software throughout the network is interlocking and interdependent. The solution suggested by IBM, using a CICS pass-through program on the host 4341 and an emulator program on the 3705 communications controller is not in operation for any other user of SNA (to the knowledge of IBM). There is a risk that such an interface could not be developed using SNA. If another network architecture, such as BTAM and BSC protocol, as used by the National Library was followed, then the interface would be significantly less complex, however terminal response time would be slower. It is speculated that IBM will announce a new communications controller later this year which will support SNA and interface with

other networks. This controller would simplify the interface for BCLN-DOBIS.

- A host to host communications link between NL-DOBIS and BCLN-DOBIS would be available for $1,000 per month plus a high-speed line, if both installations were using SNA. The National Library does not have plans to use SNA.

- IBM has suggested that based upon the workload estimates included in the RFI, 68 terminals may not be sufficient to support peak loads. Those estimates were based upon the premise that the chaining feature of DOBIS would not be used by terminal operators. Evidence from the National Library is that operators learn the chaining feature quickly, and it is considered that 68 terminals would then suffice.

Cost Estimates

Detailed cost estimates are attached. A variety of options of acquisition method are available. BCLN should qualify for an education allowance of 10% and for further customs levy and tax exemptions of 11.4% if purchased and 10.3% if leased. The exemption does not apply to terminals. Costs shown in the summary have been discounted.

Back-up

If a new facility was established for BCLN then the question of back-up would still have to be addressed.

Reliability

The only question-marks on reliability are:

- the 3380 disk subsystem is new. This is not to suggest there will be problems, but reliability is not proven.

- DOBIS running under MVS and/or VTAM would be a first. It will work, but there may be some problems along the way to clear up first.

Supplier Service and Support

IBM is excellent in this area. CDC would also be good as would Gandalf. National Library is satisfied with the support received from ALLCOM.

Expansion Capabilities

The 4341 L01 can be upgraded easily to 4341 M02, which is fully compatible with the next step, the 3031.

Maintainability

As mentioned earlier, the only concern is with the interface with external networks.

UBC PROPOSAL

SUMMARY

Ability to meet requirements

- The hardware configuration recommended to be located at UBC is basically as in the IBM proposal except that the main frame is the 4341 L01.
- Terminals proposed are ASCII start-stop terminals.
- The network is based upon 2400 baud lines from the terminals to 4 multiplexors, each with a 9600 baud trunk line to a front-end processor, a PDP 11/34 minicomputer which is connected via a 3704 controller to the 4341. The UBC terminals would connect to the UBC existing PDP 11/34, operating as a second front-end processor, which also is connected to the 4341 via a second 3704 controller.
- Response time would not be as fast as with the IBM solution.
- The interface with external networks would certainly work. UBC library systems currently have developed most of the capability required.

Cost Estimates

Detailed cost estimates are attached. UBC is not proposing to fund any of the costs of BCLN. Any equipment would have to be acquired and operated using BCLN funds.

Back-up

The two PDP 11/34 FEPs would back one another up. The back-up of the host 4341 would have to be addressed.

Reliability

The only questions relate to the host hardware facility and are as in the IBM

proposal.

Supplier Service and Support

Good support from all suggested suppliers.

Expansion Capabilities

The 4341 L01 can be upgraded easily to 4341 M02 and subsequently to a 3031.

Maintainability

In terms of ease of maintenance and operation, it is felt that the interests of BCLN as a whole would be better met if BCLN-DOBIS was to be operated and maintained by BCLN staff rather than by UBC staff for BCLN.

IBM PROPOSAL

COST SUMMARY

		Computer Facility	T.P. Network	Total
1.	Purchase Costs (discounted)			
	Data Centre (Phase III)	2,016,600.00		
	Terminals		395,831.00	
	Communications Controller		94,226.00	
	DOBIS/LIBIS Software	65,544.00		
		2,082,144.00	490,057.00	2,572,201.00
2.	Annual operating costs with purchase option			
	Data Centre equipment maintenance	103,369.00		
	Terminal maintenance		24,600.00	
	Controller maintenance		7,236.00	
	Systems software	81,012.00		
	T.P. software		5,712.00	
	Line costs		110,928.00	
	Leased modems		128,160.00	
		184,381.00	276,636.00	461,017.00
3.	Annual operating costs with lease option			
	Data Centre equipment lease	764,460.00		
	Terminal lease		129,331.00	
	Communications Controller lease		41,784.00	
	DOBIS/LIBIS software over 2 years	32,772.00		
	Systems software	81,012.00		
	T.P. software		5,712.00	
	Line costs		110,928.00	
	Leased modems		128,160.00	
		878,244.00	415,915.00	1,294,159.00

IBM PROPOSAL

POTENTIAL COST SAVINGS

1. Rather than use the 4341 G02 computer, it is considered that the 4341 L01 with 4 megabytes of main memory and 6 channels is adequate for the requirements of BCLN-DOBIS.

   The potential savings are

   - for a purchase option, $212,326.00 less initial cost $5,820.00 less annual maintenance.
   - for the lease option, $88,500.00 less annual lease.

2. Rather than lease 40 x 9600 baud modems from IBM for $128,160.00 annually it is cheaper to purchase from Gandalf 9 short-haul and 31 long-haul 9600 baud modems at an outright cost of $130,300.00 with $10,056.00 annual maintenance costs.

3. The use of Allcom terminals (as used by the National Library) instead of the IBM 327X series terminals would result in savings of

   - for a purchase option, $174,375.00 less initial cost, $3,103.80 less annual maintenance.
   - for the lease option, $26,352.00 less annual cost.

4. The use of half-duplex lines would result in a savings of 25% or $7,500.00 annually.

MODIFIED IBM PROPOSAL

COST SUMMARY

		Computer Facility	T.P. Network	Total
1.	Purchase costs			
	Data Centre equipment	1,804,274.00		
	Terminals		221,456.00	
	Communications Controller		94,226.00	
	Modems		130,300.00	
	DOBIS/LIBIS software	65,544.00		
		1,869,818.00	445,982.00	2,315,800.00
2.	Annual operating costs with purchase option			
	Data Centre equipment maintenance	97,549.00		
	Terminal maintenance		21,496.00	
	Controller maintenance		7,236.00	
	Systems software	81,012.00		
	T.P. software		5,712.00	
	Line costs		103,428.00	
	Modems maintenance		10,056.00	
		178,561.00	147,928.00	326,489.00
3.	Annual operating costs with lease option			
	Data Centre equipment lease	675,960.00		
	Terminal lease		102,979.00	
	Communications Controller lease		41,784.00	
	DOBIS/LIBIS software over 2 years	32,772.00		
	Systems software	81,012.00		
	T.P. software		5,712.00	
	Line costs		103,428.00	
	Leased modems (estimate)		44,000.00	
		799,744.00	297,903.00	1,097,647.00

MODIFIED UBC PROPOSAL

		Computer Facility	T.P. Network	Total
1.	Purchase Costs			
	Host hardware	1,875,824.00		
	DOBIS/LIBIS software	65,544.00		
	F.E.P.s 1.25 x PDP 11/34		137,500.00	
	Modems		90,125.00	
	Multiplexors		19,600.00	
	Communications Controllers		96,618.00	
		1,941,368.00	343,843.00	2,285,211.00
2.	Annual Operating Costs			
	Hardware maintenance	97,369.00		
	Systems software	81,012.00		
	F.E.P. maintenance		6,850.00	
	Modem maintenance		7,385.00	
	Multiplexor maintenance		1,000.00	
	Communications Controller maintenance		6,240.00	
	Line costs		72,000.00	
	Terminal leasing		93,840.00	
		178,381.00	187,315.00	365,696.00
3.	Annual costs, ammortizing over 5 years at 12%	528,052.00	93,525.00	
		178,381.00	187,315.00	
		706,433.00	280,840.00	987,273.00

Recommended Data Centre

Based upon the RFI response the best computer upon which to establish the data centre facility for BCLN is the IBM 4341. The original data centre configuration should be as follows:

- IBM 4341 L01 4 megabytes 6 channels
- 3380 disk subsystem with 20 gigabytes capacity
- 6 x 3420 tape drives
- 1 x 2501 card reader
- 1 x 3203 printer
- 1 x 3278 with 4632 operator console

Further, the computer would be upgraded to a 4341 M02 with 6 megabytes of main memory when acquisitions and inter-library loan functions were operational.

The 4341 L01 should use the OS/MVS operating system and memory utilization would be as follows:

- operating system 2.5 megabytes real memory
- remaining 1.5 megabytes = 4.5 megs of virtual memory
  - Production on-line DOBIS 2.1 megs
  - Test DOBIS 1.0 megs
  - ROSCOE (or equivalent) .4 megs
  - Batch partition 1.0 megs

Recommended Teleprocessing Network

The selection of the T.P. network should not at this time be made. To date, two viable network alternatives have been proposed and it is possible that BCSC will shortly propose a third. All will be technically feasible and the costs of each will be similar. With the use of modelling aids available from IBM the network can with time be configured to an optimum solution and perhaps

better sources of terminal and modem equipment can be identified.

Should BCSC be in a position to recommend a solution to the T.P. Network before the decision has to be made (a critical path analysis has indicated that a decision on the network design need not be made until three months after the data centre equipment has been ordered) the advantages they would probably be able to offer are:

- network cost savings because of sharing of resources
- reduced costs for modems and terminals because of volume discounts
- the expertise to be able to develop the required interface between BCLN and the external networks

Should BCSC end up providing the network support, the data centre configuration which would at that time be owned by the BCLN organization could, on terms acceptable to both BCLN and BCSC be 'sold' to BCSC who would in turn charge the services back to BCSC.

Recommended Software Support

Based upon the RFI response there appears at this time to be no alternative but for the software support staff to be part of the BCLN organization, unless BCSC makes such a proposal at a later date.

The advantages to in-house staff are:

- BCLN would have direct control of the priorities and activities.
- a complement of staff made up of librarian and data processing experience would be very effective in meeting the requirements for software support.
- the positions would provide a good career development for librarians within the University and College libraries wishing to increase their experience with and exposure to data processing techniques.

Other alternatives which may arise in the future are

- BCSC providing the application software support. This would be acceptable if BCSC was able to commit the number and quality of resources by BCLN and if BCLN was able to control the priorities and monitor the activities of those resources.

- Institutional staff providing the applications software support. This would only be acceptable if the resources were part of the BCLN organization and could therefore be directed to best represent the interests of BCLN members in total.

OPERATIONAL IMPACT

Business Case

Costs were calculated for three alternative ways of meeting the requirements of current B.C.U.C. members' needs for computing support for cataloging and other services. The costs were calculated covering a six-year period and factors to cover the impact of inflation on projected expenditures were applied. All costs were then adjusted to net present value (adjusting the value of future dollars to present values). The alternatives considered were:

- BCUC/UTLAS services. The cost of current services projected over the six year period. In addition, the incremental costs of obtaining the following services from UTLAS were estimated:
  - University Recon
  - Authorities Control
  - Inter-library Loans
  - Acquisitions
- BCLN/DOBIS supporting cataloging with authorities control. Costs are based upon the cost information provided in the RFI responses.
- BCLN/DOBIS supporting cataloging with authorities control, acquisitions and inter-library loans. The basic differences in the costs compared with the previous alternative are:
  - 3 more systems/data processing staff in the BCLN office.
  - 20 more terminals plus costs of additional lines and modems.
  - a computer upgrade from an IBM 4341 L01 to a 4341 M02.

The conclusions to be drawn from the business case are:

- the costs over the six-year period at net present values for BCLN/DOBIS supporting cataloging with authorities control only are $11.07 million. The cost for BCUC/UTLAS is $12.3 million, therefore a saving of $1.23 million would result.
- the incremental costs for supporting acquisitions and inter-library loans

with BCLN/DOBIS would be $0.8 million. The incremental costs to support acquisitions, inter-library loans and authorities control with BCUC/UTLAS would be $8.3 million, therefore a saving of $7.5 million would result.

The following pages document the business case itself. It should be noted that the above figures were calculated using a 15% net present value adjustment factor. The final page of the business case compares costs using both 15% and 10% factors.

BCLN/DOBIS BUSINESS CASE

ASSUMPTIONS USED

1. Present value factor of 15% was used.

2. Inflation factor of 12% was used for salaries.

3. Inflation factor of 10% was used for all other expenditures except:
   - Data Centre equipment lease (Government lease plan) from IBM has 5% maximum annual increase
   - Terminal equipment where leased is assumed to be on a 5-year lease term.

4. For BCUC/UTLAS services a workload increase of 10% annually was used for:
   - Cataloguing
   - Inter-Library Loans
   - Acquisitions

5. In determining the computing and network requirements for BCLN/DOBIS an annual workload increase of 10% was used.

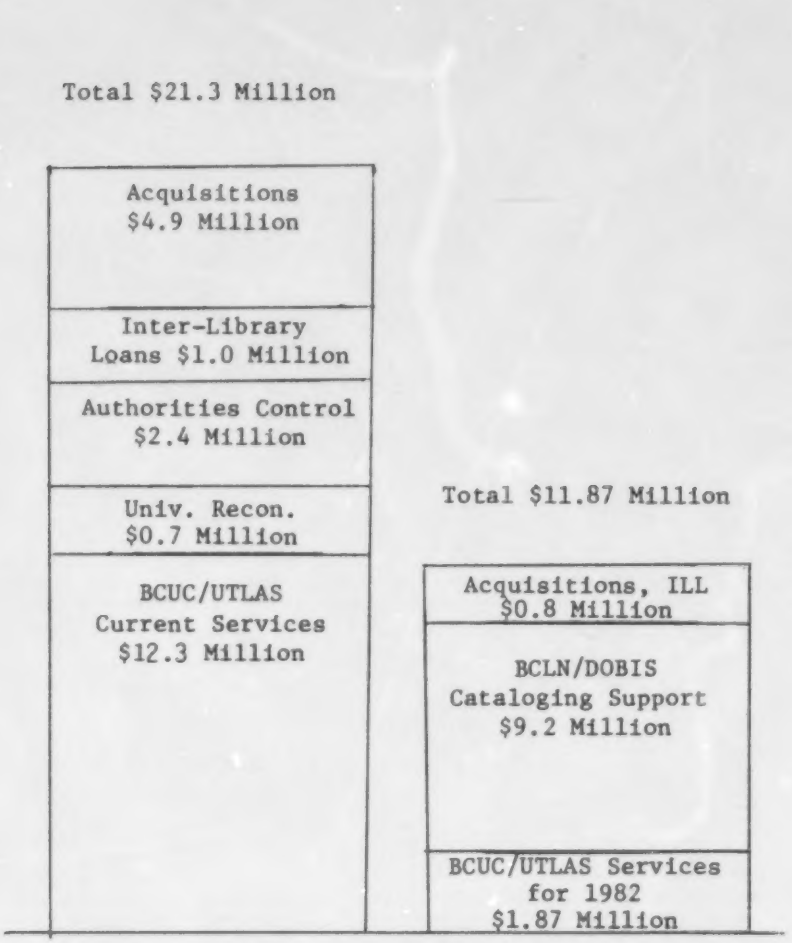
6. For the cost estimates of BCLN/DOBIS supporting Cataloguing, Acquisitions and Inter-Library Loans a C.P.U. upgrade to an IBM 4341 6J2 costing $270,135 is included in 1984.

7. For both cost estimates of BCLN/DOBIS the lease options costs assume that the data centre equipment is purchased in 1984 when purchase credits will have reached the maximum of 75% of the original purchase price.

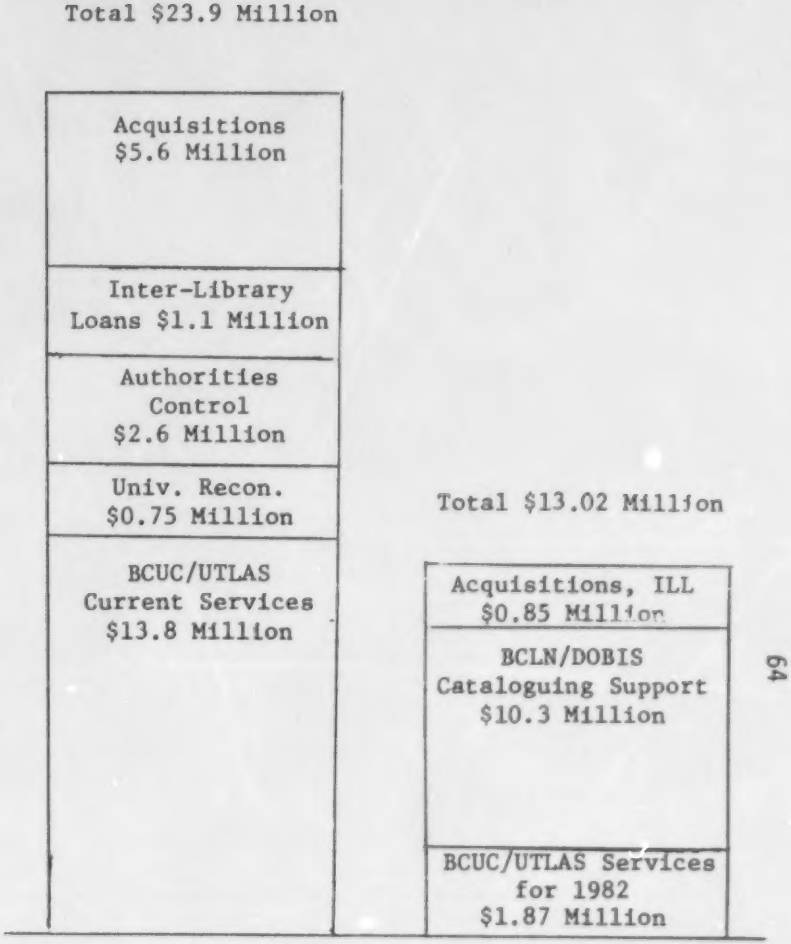
BCUC/UTLAS	1982	1983	1984	1985	1986	1987	1982-7 Total
. Costs of current services							
- UTLAS Cataloguing	1,490,000	1,802,900	2,181,509	2,639,625	3,193,947	3,864,676	
- BCUC Salaries	142,120	159,174	178,275	199,668	223,628	250,463	
- BCUC Other Expenditures	120,120	132,132	145,345	159,879	175,867	193,454	
- UBC COM Production	120,000	132,000	145,200	159,720	175,692	193,261	
TOTAL	1,872,240	2,226,206	2,650,329	3,158,892	3,769,134	4,501,854	
Net Present Value	1,872,240	1,935,908	2,003,913	2,076,971	2,155,190	2,238,321	12,282,543
. Incremental Costs of Additional Services							
- University Recon	250,000	275,000	302,500				
Net Present Value	250,000	239,140	228,720				717,820
- Authorities Control	437,060	480,766	528,842	581,726	639,899	703,889	
Net Present Value	437,060	418,074	399,857	382,484	365,894	349,973	2,353,342
- Inter-Library Loans	148,000	179,080	214,896	260,024	314,629	380,701	
Net Present Value	148,000	155,727	162,482	170,965	179,904	189,284	1,006,362
- Acquisitions	720,000	871,200	1,054,152	1,275,523	1,543,383	1,867,494	
	720,000	757,595	797,044	838,656	882,506	928,518	4,924,319

BCLN/DOBIS Cataloguing (inc. batch prod.)	1982	1983	1984	1985	1986	1987	1982-7 Total
. BCLN Salaries & Consulting Fees	552,200	706,720	791,526	886,509	992,890	1,112,037	
. BCLN Other Expenditure	240,000	272,800	300,080	330,088	363,096	399,406	
. Other Start-up Costs	472,000						
. Line Charges	10,000	69,770	76,747	84,422	92,864	102,151	
. DOBIS/LIBIS Software	65,544						
. Systems Software	40,506	95,396	104,936	115,429	126,972	139,669	
TOTAL	1,380,250	1,144,686	1,273,289	1,416,448	1,575,822	1,753,263	
Net Present Value	1,380,250	995,418	962,733	931,314	901,055	871,722	6,042,492
. Equipment Costs: Purchase							
- Data Centre Equipment	1,804,274						
- T.P. Equipment	308,642						
- Data Centre Equipment maint.	48,775	107,303	118,034	129,837	142,821	157,103	
- T.P. Equip. maint.	12,706	33,545	36,900	40,590	44,649	49,114	
- Equipment Insurance	60,000	132,000	145,200	159,720	175,692	193,261	
TOTAL	2,234,397	272,848	300,134	330,147	363,162	399,478	
Net Present Value	2,234,397	237,268	226,931	217,071	207,656	198,620	3,321,943
. Equipment Costs: Lease							
- Data Centre Equip. lease	337,980	743,556	722,738				
- Data Centre Equip. purchase			451,068				
- T.P. Equip. Lease	78,651	198,201	208,111	218,516	229,442	240,914	
- D.C. Equip. Maint.			5,000	129,837	142,821	157,103	
- Equipment Insurance			5,000	120,000	132,000	145,200	
TOTAL	416,631	941,757	1,391,917	468,353	504,263	543,217	
Net Present Value	416,631	818,951	1,052,428	307,942	288,337	270,087	3,154,376

BCLN/DOBIS Cataloguing, Acquisitions, Inter-Library Loans	1982	1983	1984	1985	1986	1987	1982-7 Total
. BCLN Salaries & Consulting Fees	552,200	795,200	890,620	997,498	1,117,198	1,251,262	
. BCLN Other Expenditures	240,000	272,800	300,080	330,088	363,096	399,406	
. Other Start-up Costs	472,000						
. Line Charges	10,000	113,770	125,147	137,662	151,428	166,571	
. DOBIS/LIBIS Software	65,544						
. Systems Software	40,506	95,396	104,936	115,429	126,972	139,669	
TOTAL	1,380,250	1,277,166	1,420,783	1,580,677	1,758,694	1,956,908	
Net Present Value	1,380,250	1,110,623	1,074,254	1,039,295	1,005,621	972,974	6,583,017
. Equipment Costs: Purchase							
- Data Centre Equipment	1,804,274		270,135				
- T.P. Equipment	308,642	137,340					
- D.C. Equipment Maint.	48,775	107,303	124,034	136,437	150,081	165,089	
- T.P. Equipment Maint.	12,706	42,666	46,933	51,626	56,789	62,468	
- Equipment Insurance	60,000	132,000	145,200	159,720	175,692	193,261	
TOTAL	2,234,397	419,309	586,302	347,783	382,562	420,818	
Net Present Value	2,234,397	364,631	443,302	228,667	218,748	209,230	3,698,975
. Equipment Costs: Lease							
- Data Centre Equipment lease	337,980	743,556	722,738				
- D.C. Equipment Purchase			721,203				
- T.P. Equipment Lease	78,651	213,922	224,618	235,849	247,642	260,024	
- D.C. Equipment Maint.			5,000	136,437	150,081	165,089	
- Equipment Insurance			5,000	120,000	132,000	145,200	
TOTAL	416,631	957,478	1,678,559	492,286	529,723	570,313	
Net Present Value	416,631	832,622	1,269,158	323,678	302,895	283,559	3,428,543



Total costs for 1982-87 at net present value using 15% factor.



Total costs for 1982-87 at net present value using 10% factor.

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Start-up Costs and Schedules

A critical path analysis was developed for the implementation activities required to install BCLN-DOBIS. The critical path was found to be 18 months, but could be reduced to 12 months as follows:

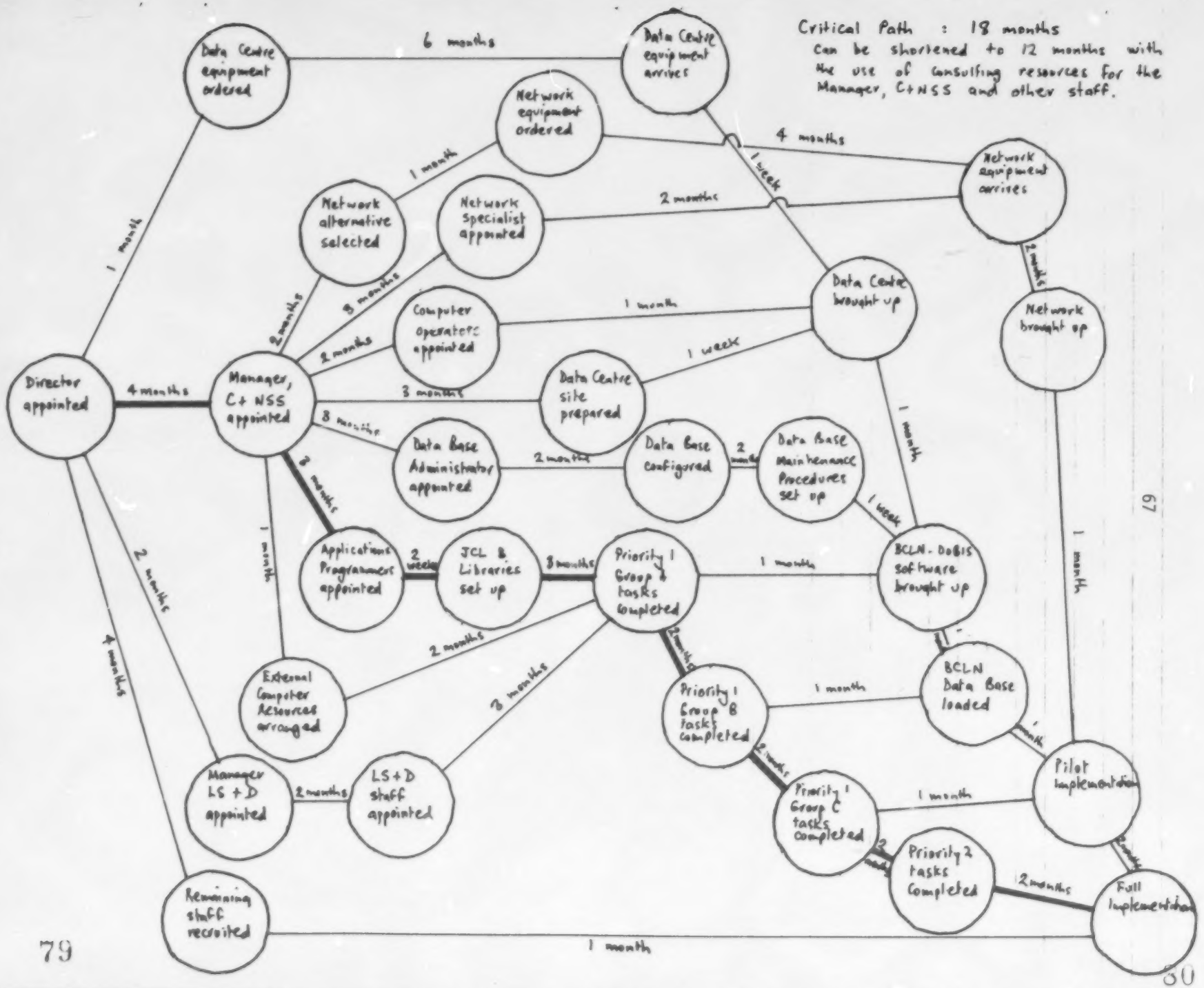
- Use external resources for the Manager, Computing and Network Support Services and at least one and p[illegible]ably two applicatons programmers.
- fill the positions of Manager, [illegible]rary Services and Development and other Library Services and Development staff immediately with qualified staff from within the B.C.U.C. library community.

The starting point of the 12 month implementation period is the appointment of a director for the BCLN organization. Development tasks from the 'Data Base Load and User Requirements Study' have been incorporated into the implementation schedule.

The table 'Cummulative Expenditures During 12 Month Start-up Period' shows how expenditures will be made and when during the implementation period.

	$	Month 1	2	3	4	5	6	7	8	9	10	11	12
Salaries/consulting fees		12,100	24,200	48,400	84,150	129,800	184,250	241,340	298,430	355,520	417,560	484,880	552,200
BCLN office expenditures		20,670	41,340	62,010	82,680	103,350	124,020	144,690	165,360	186,030	206,700	227,370	240,000
Facility start-up			25,000	50,000	104,000	164,000	197,000	197,000	197,000	197,000	197,000	197,000	197,000
Recruiting			6,000	12,000	18,000	24,000	30,000	36,000	42,000	48,000	50,000	50,000	50,000
External computer testing				24,000	48,000	72,000	96,000	120,000	120,000	120,000	120,000	120,000	120,000
Tape costs (UTLAS)									105,000	105,000	105,000	105,000	105,000
Line charges									2,000	4,000	6,000	8,000	10,000
DOBIS/LIBIS software								65,544	65,544	65,544	65,544	65,544	65,544
Systems software								6,751	13,502	20,253	27,004	33,755	40,506
Data Centre equipment lease								56,330	112,660	168,990	225,320	281,650	337,980
T.P. equipment lease									15,730	31,460	47,190	62,920	78,651
Total	$	32,770	96,540	196,410	336,830	493,150	631,270	867,655	1,137,226	1,301,797	1,467,318	1,636,119	1,796,881

Lease Option
Cumulative expenditures during 12 month start-up period


Critical Path : 18 months
Can be shortened to 12 months with the use of consulting resources for the Manager, C+NSS and other staff.
Director appointed
Manager, C+ NSS appointed
Data Centre equipment ordered
Data Centre equipment arrives
Network equipment ordered
Network equipment arrives
Network alternative selected
Network specialist appointed
Data Centre brought up
Network brought up
Computer operators appointed
Data Centre site prepared
Data Base Administrator appointed
Data Base configured
Data Base Maintenance Procedures set up
Applications Programmers appointed
JCL & Libraries set up
Priority 1 Group A tasks completed
BCLN - DOBIS software brought up
BCLN Data Base loaded
Priority 1 Group B tasks completed
Priority 1 Group C tasks completed
Priority 2 tasks completed
Pilot implementation
Full implementation
External Computer Resources arranged
Manager LS+D appointed
LS+D staff appointed
Remaining staff recruited
6 months
4 months
1 month
2 months
3 months
1 week
2 weeks
1 month
2 months
3 months
1 month
1 week
2 months
1 month
2 months
1 week
1 month
2 months
3 months
1 month
2 weeks
1 month
2 weeks
1 month
2 months
1 month
1 month
79
67
80

BCLN Cost Analysis

. Start-up costs over 12 month period

- BCLN Salaries / Consulting Fees	$ 552,200
- BCLN Other expenditures (space, utilities, supplies, etc.)	240,000
- Other start-up costs	
- UTLAS tape costs	105,000
- External computer time	120,000
- Recruiting	50,000
- Facility start-up	
- site preparation	48,000
- tape reels, racks, cabinets	49,000
- custom software (Datapac interface)	100,000
- Line charges	10,000
- DOBIS/LIBIS software	65,544
- Systems software (operating system etc.)	40,506
	$1,380,250
- Equipment costs: purchase option	
- Data Centre equipment purchase	1,804,274
- T.P. equipment purchase	308,642
- Data Centre equipment maintenance	48,775
- T.P. equipment maintenance	12,706
- Equipment insurance	60,000
	$2,234,397
- Equipment costs: lease option	
- Data Centre equipment lease	337,980
- T.P. equipment lease	78,651
	$ 416,631

. Total start-up costs

- Purchase option	$3,614,647
- Lease option	$1,796,881

. Annual operating costs in 1981/82 dollars

- Cataloguing with Authorities Control

- BCLN salaries	$ 631,000
- BCLN other expenditures	248,000
- Line charges	63,428
- System software	86,724
	$1,029,152

- Equipment costs: purchase option

- Data Centre equipment maintenance	97,549
- T.P. equipment maintenance	30,494
- Equipment insurance	120,000
	$ 248,043

- Equipment costs: lease option

- Data Centre equipment lease	$ 675,960
- T.P. equipment lease	130,378
	$ 806,338

- Cataloguing with Authorities Control, acquisitions and inter-library loans

- BCLN salaries	$ 710,000
- BCLN other expenditures	248,000
- Line charges	103,428
- System software	86,724
	$1,148,152

- Equipment costs: purchase option

- Data Centre equipment maintenance	$ 103,369
- T.P. equipment maintenance	38,788
- Equipment insurance	120,000
	$ 262,157

- Equipment costs: lease option

- Data Centre equipment lease	$ 764,460
- T.P. equipment lease	194,475
	$ 958,935

STAFFING REQUIREMENTS

Office of the Director	Cataloging Only FTE	Cataloging Only Salary	Cataloging, ILL Acquisitions FTE	Cataloging, ILL Acquisitions Salary
Director	1	45,000	1	45,000
Accountant	1	28,000	1	28,000
Accounting Clerk	1	15,000	1	15,000
Secretary	1	16,000	1	16,000
Clerk Typist	1	14,000	1	14,000
Library Services & Development				
Manager, LS & D	1	38,000	1	38,000
Authorities- Standards Librarian	1	31,000	1	31,000
Corrections- Duplicates Assistant	1	16,000	1	16,000
Network Services Representatives	2	46,000	2	46,000
Librarian Systems Analysts	1.5	46,500	3	93,000
Computing and Network Services				
Manager, C & NSS	1	45,000	1	45,000
Applicatons Programmer Analysts	1.5	37,500	3	75,000
Data Base Administrator	1	32,000	1	32,000
Data Control Clerks	2	36,000	2	36,000
T.P. Network Specialist	1	28,000	1	28,000
Computer Operators	3	52,000	3	52,000
Systems Programmer	1	35,000	1	35,000
Total	22	626,000	25	710,000

Staffing requirements are shown for the Cataloging Only and Cataloging with Inter-library Loans and Acquisitions functions. Should BCLN contract for the computing facility the positions of 3 Computer Operators and 1 Systems Programmer would not be required.

During the implementation period the activities of all Library Services and Development and Computing and Network Services staff will be directed towards implementation of BCLN-DOBIS supporting Cataloguing with Authorities Control.

During the first year of full operations some of the staff will be directed towards developing and implementing Acquisition and Inter-Library Loans Support. Also, interfaces between BCLN-DOBIS and mini-computer based systems within the Province could be developed.

REQUEST FOR PROPOSALS

Introduction

As previously stated, it is not considered necessary to follow an RFP process for the selection of the data centre equipment as the configuration recommended (IBM 4341 etc.) appears to be clearly the best alternative.

Upon subsequent refinement and selection of a teleprocessing network design an RFP process should be considered for the acquisition of the T.P. equipment (terminals, modems, communications controller).

If an RFP is issued it should contain the following:

RFP Contents

- Requirements: from the "Hardware and Computing Facilities Requirements" section of this report.
- Conference date: the date of a briefing session at which vendor's questions will be addressed.
- Proposal due date: closing date.
- Vendor presentations: dates when short-listed vendors will be requested to make presentations.
- Contracting conditions: any clauses or conditions BCLN may wish to establish, e.g. ownership of software, documentation standards etc.
- Awarding date.
- General comments.

RFP Evaluation

Responses to the RFP should be evaluated upon a number of factors including the following:

- Ability to meet the requirements. The requirements as documented should

be divided into mandatory and desirable categories. Desirable features should be assigned weight factors. The ability of each response to meet the requirements should be evaluated and given a point value. Any mandatory requirement not addressed should lead to the elimination of that response. Point values multiplied by weighting factors for each response will give the total points score.

- Cost information: cost details of each response should be summarized and compared.
- Back-up: in the event of equipment failure BCLN will depend upon an adequate and responsive back-up. The back-up facilities of each response should be analyzed and any deficiencies highlighted.
- Reliability: the reliability of the goods or services proposed (both hardware and software) must be established. It is helpful to request references from suppliers. State-of-the-art technologies should be avoided by BCLN.
- Supplier service and support: again, references should be checked. Particular attention should be paid to the support vendors will provide to remote locations.
- Expansion capabilities: any goods or services proposed must be capable of being easily expanded to support increased workload.
- Standard products: BCLN should only consider standard product offerings for both hardware and software and should avoid becoming locked in to the products of one vendor.

APPENDIX A

BRITISH COLUMBIA LIBRARY NETWORK

REQUEST FOR INFORMATION

CONTENTS

... BACKGROUND TO BCLN

... OBJECTIVES OF RFI

... HARDWARE AND COMPUTING FACILITIES REQUIREMENTS

--- Functional Requirements

--- Performance Requirements

--- on-line responsiveness

--- on-line transaction volumes

--- terminal requirements

--- disk storage requirements

--- computer main memory requirements

--- application software support requirements

... RESPONSE INSTRUCTIONS

... INVITED RESPONSES

BACKGROUND TO BCLN

The British Columbia Union Catalogue (BCUC) is currently composed of twenty-eight member libraries and the BCUC central office. In the last three years library members have co-operated to build a union data base of over one million records. They have also implemented a common on-line catalogue support system, defined and accepted common bibliographic and coding standards, many have closed their manual card catalogues and replaced them with computer products and services and engaged in a project, Shared Authorities File (SHARAF) to build an authority file that will be of use to libraries all over Canada.

In July 1980 the BCUC submitted a proposal to obtain funds from the Provincial Government to establish a computer based library service utility in British Columbia. This proposed development has been named the British Columbia Library Network (BCLN).

At present, member libraries of BCUC contract for on-line computer services out-of-province from the University of Toronto Library Automation Systems (UTLAS). The proposed BCLN would utilize the DOBIS system (an IBM field developed product: Dortmund library system) as used by the National Library of Canada, Ottawa.

The proposed development of BCLN is currently in Design Phase I which consists of two separate sub-studies.

- BCUC Data Base Loading and BCLN User and Data Base Requirements Study. This study with a scheduled completion date of April 1981 is being conducted by two systems librarians from one of the member libraries.

- BCLN Hardware and Computing Facilities Evaluation Study. This study with a scheduled completion date of early April 1981 is being conducted under contract by Systems West Consultants Ltd., Victoria Branch, with the following objectives:
  - to provide cost and technical information and recommendations to the Project Review Committee to enable it to make a major milestone decision regarding implementation of the BCLN-DOBIS system.
  - to provide information and recommendations to the Project Review Committee to enable it to make a decision regarding the selection of an appropriate computing facility equipment and site for the BCLN-DOBIS system.
  - to provide information in a form required for a Request for Proposals so that a computing facilities contract could be awarded on a competitive basis.

It is in support of the objectives of the BCLN Hardware and Computing Facilities Evaluation Study that this RFI is issued. The detailed objectives of the RFI are contained in the next section.

Assuming the implementation of the BCLN is approved, the first step in the implementation phase would be a pilot project at a location to be selected. It is not expected that the BCLN will be implemented with all the functions and locations included in the Requirements section of this RFI until March 1983.

OBJECTIVES OF THE REQUEST FOR INFORMATION

The RFI process and subsequent responses are intended to serve the following purposes:

- to document the requirements of the BCLN in terms of hardware and computing facilities.

- based upon cost information in the responses, to provide firm estimates of start-up and operating costs of the BCLN in terms of hardware and computing facilites.

- based upon suggested solutions in the responses, to assist in the design of the BCLN in terms of hardware and commputing facilities by resolving such issues as:
  - central versus distributed hardware
  - dedicated versus shared hardware and computing facilities
  - in-house versus contracted data centre
  - in-house versus contracted application software support
  - optimum method of chargeback of hardware and computing facility costs.

- to serve as a screening process, to be followed, at a later date, by a Request for Proposals (RFP) to a short-list of selected suppliers.

SERVICES TO BE PROVIDED

Services to be provided under this RFI are considered to fall under three categories:

- Hardware
- Teleprocessing Network
- Application software support

Suppliers may propose solutions for any of these categories.

Hardware

This category includes:

- the computer processing capability to support BCLN
- peripheral equipment such as disk and tape drives, card readers and printers, etc. required to support the computer processing capability
- software to support the computer processing capability and peripheral equipment such as operating system and utilities and all required systems software products and languages (e.g. CICS, VTAM, Assembler, PL/1)
- personnel to support the above hardware and software for both operating and maintenance.

Suppliers may wish to propose solutions which

- propose a particular hardware configuration or alternative configurations, or
- propose the services of a bureau, or
- a combination of both.

Regardless of the nature of the solution, the supplier must provide

- a detailed description of the proposed solutions including specific equipment, and performance and capacity technical data.

- full cost estimates: where alternate costing methods (e.g. by algorithm or number of users) or methods of financing are available, each alternative should be identified.

Teleprocessing Network

This category includes

- the communications lines
- the CRT terminals and remote printers in the library locations
- all equipment required to support the T.P. Network including modems and control units
- communications software (e.g. protocol)
- personnel to support the above equipment and software for both operating and maintenance.

It is recognized that some equipment and software might logically fit into either theT.P. Network or Hardware categories.

Again the supplier must provide in the proposed solution

- a detailed description including specific equipment and performance and capacity technical data
- full cost estimates with alternate methods of financing or costing.

Application Software Support

This category includes:

- Data Control
- Data Base Administration
- Application Software maintenance and enhancements.

A supplier must demonstrate that their organization possesses the required resources, both in number and skill level and should provide cost estimates.

A 8.

HARDWARE AND COMPUTING FACILITIES REQUIREMENTS

Functional Requirements

The BCLN will utilize the National Library version of DOBIS to support the following functions

- Catalogue support with authorities control
- Acquisitions
- Inter Library Loans
- Batch Products
  - COM Catalogue
  - Catalogue Cards
  - Purchase Orders
  - Reports
- Data Base Maintenance

Associated with the first three functions are numerous on-line transactions. The last two functions operate in a batch or background mode. The volumes of on-line transactions and estimates of batch processing are included in the section 'Performance Requirements'.

The NL-DOBIS system utilizes the following systems software products or languages:

- PL/1
- Assembler
- CICS
- VTAM
- BDAM
- OS/MVS and utilities

Any proposed computing facility must be capable of either supporting the above, or of supporting a feasible alternative. In the case where an alternative is proposed, the supplier must provide enough data to substantiate the feasibility of such an alternative.

In addition, all users of BCLN-DOBIS must have access through the same terminal to other library systems in North America via Datapac and to the National Library DOBIS in Ottawa.

Performance Requirements

The performance requirements contained in this section have been compiled based upon a number of sources.

- DOBIS transaction volume estimating model developed by the National Library.

- Expansion of this model from transactions to characters (out and in) by Systems West with information provided by IBM.

- Analysis of the operating environment at two current DOBIS users:
  - National Library, Ottawa
  - Centennial College, Toronto.

- Proposed BCLN-DOBIS workload estimates prepared by BCUC.

On-Line Responsiveness

The maximum response time acceptable, regardless of terminal location or function being performed is three seconds. All solutions proposed by suppliers must address this standard.

On-Line Transaction Volumes

The following tables show estimates of characters out and in by function for each library which may become a user of BCLN-DOBIS.

- Estimates are based upon expected 81/82 workloads. The expected rate of increase in subsequent years is 10% annually.

- Tables are compiled for the following on-line functions:

  - Cataloguing - update
    - derived
    - original
    - all (sum of above)
    - Aquisitions
    - Search only (ILL)

- For each location and function characters in and out are estimated for

- average monthly volume
- peak monthly volume
- peak hourly volume

- It should be noted that DOBIS is a menu-driven system hence characters in is substantially greater than characters out.

FUNCTION: CATALOGUING - ORIGINAL

Library	Monthly Average 10^6 Characters		Peak Month 10^6 Characters		Peak Hour 10^6 Characters	
	Out	In	Out	In	Out	In
Simon Fraser University	1.52	41.12	4.57	123.48	0.042	1.12
U.B.C.	4.56	123.36	13.71	370.44	0.125	3.37
University of Victoria	2.28	61.68	6.86	185.22	0.063	1.69
B.C.I.T. (Burnaby)	0.76	20.56	2.29	61.74	0.021	0.56
Camosun College (Victoria	0.38	10.28	1.15	30.87	0.011	0.28
Capilano College (North Van)	0.46	12.34	1.37	37.04	0.012	0.34
Cariboo College (Kamloops)	0.30	8.22	0.91	24.70	0.008	0.22
Douglas College (Richmond)	0.90	24.66	2.74	74.08	0.024	0.68
David Thompson Univ. Centre (Nelson)	0.46	12.34	1.37	37.04	0.012	0.34
East Kootenay College (Cranbrook)	0.15	4.11	0.46	12.35	0.004	0.11
Fraser Valley College (Abbotsford)	0.15	4.11	0.46	12.35	0.004	0.11
Justice Institute (Vancouver)	0.15	4.11	0.46	12.35	0.004	0.11
Malaspina College (Nanaimo)	0.30	8.22	0.91	24.70	0.008	0.22
College of New Caledonia (Pr. George)	0.46	12.34	1.37	37.04	0.012	0.34
Northern Lights College (Dawson Creek)	0.26	7.19	0.81	21.61	0.007	0.19
Northwest College (Terrace)	0.38	10.28	1.15	30.87	0.011	0.28
Okanagan College (Kelowna)	0.30	8.22	0.91	24.70	0.008	0.22
Open Learning Inst. (Richmond)	0.03	1.03	0.12	3.09	0.001	0.03
Pacific Vocational Inst. (Burnaby)	0.15	4.11	0.46	12.35	0.004	0.11
Selkirk College (Castlegar)	0.26	7.19	0.81	21.61	0.007	0.19
Vancouver Comm. College (Vancouver)	0.90	24.66	2.74	74.08	0.024	0.68
Burnaby Public Library	0.61	16.45	1.83	49.39	0.017	0.45
Greater Victoria Public Library	0.92	24.68	2.74	74.08	0.024	0.68
Richmond Public Library	0.61	16.45	1.83	49.39	0.017	0.45
Legislative Lib. of B.C. (Victoria)	0.33	9.25	1.03	27.78	0.009	0.25
Ministry of Educ. Lib (Victoria)	0.03	1.03	0.12	3.09	0.001	0.03
Vancouver Special Libraries (Vancouver)	0.23	6.17	0.81	21.61	0.007	0.19
New Westminster Public Library	0.57	15.42	1.72	46.31	0.016	0.42
North Vancouver City Library	0.42	11.31	1.26	33.96	0.012	0.31
North Vancouver District Library	0.40	10.90	1.21	32.73	0.012	0.30
Port Moody Public Library	0.22	5.96	0.66	17.91	0.006	0.16
Vancouver Public Library	1.52	41.12	4.57	123.48	0.042	1.12
West Vancouver Mem. Library	0.84	22.62	2.51	67.91	0.023	0.62

FUNCTION: CATALOGUING - DERIVED

Library	Monthly Average 10^6 Characters		Peak Month 10^6 Characters		Peak Hour 10^6 Characters	
	Out	In	Out	In	Out	In
Simon Fraser University	0.23	10.83	0.71	31.51	0.0064	0.286
U.B.C.	0.70	32.50	2.12	94.53	0.0193	0.859
University of Victoria	0.35	16.25	1.06	47.27	0.0097	0.429
B.C.I.T. (Burnaby)	0.12	5.42	0.36	15.71	0.0032	0.143
Camosun College (Victoria)	0.06	2.71	0.18	7.86	0.0016	0.072
Capilano College (North Van)	0.07	3.25	0.21	9.45	0.0019	0.086
Cariboo College (Kamloops)	0.046	2.17	0.14	6.30	0.0013	0.057
Douglas College (Richmond)	0.14	6.50	0.42	18.91	0.0038	0.172
David Thompson Univ. Centre (Nelson)	0.07	3.25	0.21	9.45	0.0019	0.086
East Kootenay College (Cranbrook)	0.02	1.08	0.07	3.15	0.0006	0.029
Fraser Valley College (Abbotsford)	0.02	1.08	0.07	3.15	0.0006	0.029
Justice Institute (Vancouver)	0.02	1.08	0.07	3.15	0.0006	0.029
Malaspina College (Nanaimo)	0.04	2.16	0.14	6.30	0.0012	0.058
College of New Caledonia (Prince George)	0.07	3.25	0.21	9.45	0.0019	0.086
Northern Lights College (Dawson Creek)	0.04	1.90	0.12	5.51	0.0011	0.050
Northwest College (Terrace)	0.06	2.71	0.18	7.86	0.0016	0.072
Okanagan College (Kelowna)	0.04	2.16	0.14	6.30	0.0012	0.058
Open Learning Inst. (Richmond)	0.006	0.27	0.018	0.79	0.0002	0.007
Pacific Vocational Inst. (Burnaby)	0.02	1.08	0.07	3.15	0.0006	0.029
Selkirk College (Castlegar)	0.04	1.90	0.12	5.51	0.0011	0.050
Vancouver Comm. College (Vancouver)	0.14	6.50	0.42	18.91	0.0038	0.172
Burnaby Public Library	0.09	4.33	0.28	12.60	0.0026	0.114
Greater Victoria Public Library	0.14	6.50	0.43	18.91	0.0038	0.172
Richmond Public Library	0.09	4.33	0.28	12.60	0.0026	0.114
Legislative Lib. of B.C. (Victoria)	0.05	2.44	0.16	7.09	0.0014	0.064
Ministry of Educ. Lib. (Victoria)	0.006	0.27	0.018	0.79	0.0002	0.007
Vancouver Special Libraries (Vancouver)	0.035	1.63	0.107	4.73	0.0009	0.043
New Westminster Public Library	0.086	4.06	0.266	11.82	0.0024	0.107
North Vancouver City Library	0.063	2.98	0.196	8.67	0.0018	0.079
North Vancouver District Library	0.061	2.87	0.188	8.35	0.0017	0.076
Port Moody Public Library	0.033	1.57	0.103	4.57	0.0009	0.041
Vancouver Public Library	0.23	10.83	0.71	31.51	0.0064	0.286
West Vancouver Memorial Library	0.127	5.96	0.39	17.33	0.0035	0.157

FUNCTION: CATALOGUING - UPDATE

Library	Monthly Average 10^6 Characters		Peak Month 10^6 Characters		Peak Hour 10^6 Characters	
	Out	In	Out	In	Out	In
Simon Fraser University	0.13	5.28	0.314	12.67	0.0029	0.115
U.B.C.	0.39	15.84	0.941	38.02	0.0086	0.346
University of Victoria	0.20	7.92	0.471	19.01	0.0043	0.173
B.C.I.T. (Burnaby)	0.07	2.64	0.157	6.34	0.0024	0.082
Camosun College (Victoria)	0.03	1.32	0.078	3.17	0.0007	0.029
Capilano College (North Van.)	0.04	1.58	0.094	3.80	0.0009	0.035
Cariboo College (Kamloops)	0.03	1.06	0.063	2.53	0.0006	0.023
Douglas College (Richmond)	0.08	3.17	0.188	7.61	0.0017	0.069
David Thompson Univ. Centre (Nelson)	0.04	1.58	0.094	3.80	0.0009	0.035
East Kootenay College (Cranbrook)	0.01	0.53	0.031	1.27	0.0003	0.012
Fraser Valley College (Abbotsford)	0.01	0.53	0.031	1.27	0.0003	0.012
Justice Institute (Vancouver)	0.01	0.53	0.031	1.27	0.0003	0.012
Malaspina College (Nanaimo)	0.03	1.06	0.063	2.53	0.0006	0.023
College of New Caledonia (Prince George)	0.04	1.58	0.094	3.80	0.0009	0.035
Northern Lights College (Dawson Creek)	0.02	0.92	0.055	2.22	0.0005	0.020
Northwest College (Terrace)	0.03	1.32	0.078	3.17	0.0007	0.029
Okanagan College (Kelowna)	0.03	1.06	0.063	2.53	0.0006	0.023
Open Learning Inst. (Richmond)	0.003	0.13	0.008	0.32	0.00007	0.003
Pacific Vocational Inst. (Burnaby)	0.01	0.53	0.031	1.27	0.0003	0.012
Selkirk College (Castlegar)	0.02	0.92	0.055	2.22	0.0005	0.020
Vancouver Comm. College (Vancouver)	0.08	3.17	0.188	7.61	0.0017	0.069
Burnaby Public Library	0.05	2.11	0.126	5.07	0.0011	0.046
Greater Victoria Public Library	0.08	3.17	0.188	7.61	0.0017	0.069
Richmond Public Library	0.05	2.11	0.125	5.07	0.0011	0.046
Legislative Lib. of B.C. (Victoria)	0.03	1.06	0.063	2.53	0.0006	0.023
Ministry of Educ. Lib. (Victoria)	0.003	0.13	0.008	0.32	0.00007	0.003
Vancouver Special Libraries (Vancouver)	0.02	0.79	0.047	1.90	0.0004	0.017
New Westminster Public Library	0.05	1.98	0.118	4.75	0.0011	0.043
North Vancouver City Library	0.04	1.45	0.086	3.48	0.0008	0.032
North Vancouver District Library	0.03	1.40	0.083	3.36	0.0008	0.030
Port Moody Public Library	0.02	0.77	0.046	1.84	0.0004	0.017
Vancouver Public Library	0.13	5.28	0.314	12.67	0.0029	0.115
West Vancouver Memorial Library	0.07	2.90	0.173	6.97	0.0016	0.063

FUNCTION: CATALOGUING - ALL

Library	Monthly Average 10^6 Characters Out	Monthly Average 10^6 Characters In	Peak Month 10^6 Characters Out	Peak Month 10^6 Characters In	Peak Hour 10^6 Characters Out	Peak Hour 10^6 Characters In
Simon Fraser University	1.88	57.23	5.594	167.66	0.0513	1.521
U.B.C.	5.65	171.7	16.771	502.99	0.1529	4.575
University of Victoria	2.83	85.85	7.920	251.50	0.077	2.292
B.C.I.T. (Burnaby)	0.95	28.62	2.807	83.79	0.0266	0.785
Camosun College (Victoria)	0.47	14.31	1.408	41.90	0.0133	0.381
Capilano College (North Van)	0.57	17.17	1.674	50.29	0.0148	0.461
Cariboo College (Kamloops)	0.376	11.45	1.113	33.53	0.0099	0.300
Douglas College (Richmond)	1.12	34.33	3.348	100.60	0.0295	0.921
David Thompson Univ. Centre (Nelson)	0.57	17.17	1.674	50.29	0.0148	0.461
East Kootenay College (Cranbrook)	0.18	5.72	0.561	16.77	0.0049	0.151
Fraser Valley College (Abbotsford)	0.18	5.72	0.561	16.77	0.0049	0.151
Justice Institute (Vancouver)	0.18	5.72	0.561	16.77	0.0049	0.151
Malaspina College (Nanaimo)	0.37	11.44	1.113	33.53	0.0098	0.301
College of New Caledonia (Prince George)	0.57	17.17	1.674	50.29	0.0148	0.461
Northern Lights College (Dawson Creek)	0.32	10.01	0.985	29.34	0.0086	0.260
Northwest College (Terrace)	0.47	14.31	1.408	41.90	0.0133	0.381
Okanagan College (Kelowna)	0.37	11.44	1.113	33.53	0.0098	0.301
Open Learning Inst. (Richmond)	0.039	1.43	0.146	4.20	0.00127	0.040
Pacific Vocational Inst. (Burnaby)	0.18	5.72	0.561	16.77	0.0049	0.151
Selkirk College (Castlegar)	0.32	10.01	0.985	29.34	0.0086	0.260
Vancouver Comm. College (Vancouver)	1.12	34.33	3.348	100.60	0.0295	0.921
Burnaby Public Library	0.75	22.89	2.236	67.06	0.0207	0.610
Greater Victoria Public Library	1.14	34.35	3.358	100.60	0.0295	0.921
Richmond Public Library	0.75	22.89	2.235	67.06	0.0207	0.610
Legislative Lib. of B.C. (Victoria)	0.41	12.75	1.253	37.40	0.011	0.337
Ministry of Educ. Lib. (Victoria)	0.039	1.43	0.146	4.20	0.00127	0.040
Vancouver Special Libraries (Vancouver)	0.285	8.59	0.964	28.24	0.0083	0.250
New Westminster Public Library	0.706	21.46	2.104	62.88	0.0195	0.570
North Vancouver City Library	0.523	15.74	1.542	46.11	0.0146	0.421
North Vancouver District Library	0.491	15.17	1.411	44.44	0.0145	0.406
Port Moody Public Library	0.273	8.30	0.809	24.32	0.0073	0.218
Vancouver Public Library	1.88	57.23	5.594	167.66	0.0513	1.521
West Vancouver Memorial Library	1.037	31.48	3.073	92.21	0.0281	0.840

FUNCTION: ACQUISITIONS

Library	Monthly Average 10^6 Characters Out	Monthly Average 10^6 Characters In	Peak Month 10^6 Characters Out	Peak Month 10^6 Characters In	Peak Hour 10^6 Characters Out	Peak Hour 10^6 Characters In
Simon Simon Fraser University	.88	23.58	2.45	66.00	0.022	0.600
U.B.C.	2.63	70.75	7.34	198.00	0.067	1.800
University of Victoria	1.32	35.38	3.67	99.00	0.034	0.900
B.C.I.T. (Burnaby)	0.44	11.79	1.23	33.00	0.011	0.300
Camosun College (Victoria)	0.22	5.90	0.61	16.50	0.006	0.150
Capilano College (North Van)	0.26	7.08	0.73	19.80	0.007	0.180
Cariboo College (Kamloops)	0.18	4.72	0.49	13.20	0.004	0.120
Douglas College (Richmond)	0.53	14.15	1.47	39.60	0.013	0.360
David Thompson Univ. Centre (Nelson)	0.26	7.08	0.73	19.80	0.007	0.180
East Kootenay College (Cranbrook)	0.09	2.36	0.25	6.60	0.002	0.060
Fraser Valley College (Abbotsford)	0.09	2.36	0.25	6.60	0.002	0.060
Justice Institute (Vancouver)	0.09	2.36	0.25	6.60	0.002	0.060
Malaspina College (Nanaimo)	0.18	4.72	0.49	13.20	0.004	0.120
College of New Caledonia (Prince George)	0.26	7.08	0.73	19.80	0.007	0.180
Northern Lights College (Dawson Creek)	0.15	4.13	0.43	11.55	0.004	0.105
Northwest College (Terrace)	0.22	5.90	0.61	16.50	0.006	0.150
Okanagan College (Kelowna)	0.18	4.72	0.49	13.20	0.004	0.120
Open Learning Inst. (Richmond)	0.02	0.59	0.06	1.65	0.0006	0.015
Pacific Vocational Inst. (Burnaby)	0.09	2.36	0.25	6.60	0.002	0.060
Selkirk College (Castlegar)	0.15	4.13	0.43	11.55	0.004	0.105
Vancouver Comm. College (Vancouver)	0.53	14.15	1.47	39.60	0.013	0.360
Burnaby Public Library	0.35	9.43	0.98	26.40	0.009	0.240
Greater Victoria Public Library	0.53	14.15	1.47	39.60	0.013	0.360
Richmond Public Library	0.35	9.43	0.98	26.40	0.009	0.240
Legislative Lib. of B.C. (Victoria)	0.20	5.31	0.55	14.85	0.005	0.135
Ministry of Educ. Lib. (Victoria)	0.02	0.59	0.06	1.65	0.0006	0.015
Vancouver Special Libraries (Vancouver)	0.13	3.54	0.37	9.90	0.003	0.090
New Westminster Public Library	0.33	8.84	0.92	24.75	0.008	0.225
North Vancouver City Library	0.24	6.49	0.67	18.15	0.006	0.165
North Vancouver District Library	0.23	6.25	0.60	17.49	0.006	0.159
Port Moody Public Library	0.13	3.42	0.3	9.57	0.003	0.087
Vancouver Public Library	0.88	23.58	2.45	66.00	0.022	0.600
West Vancouver Memorial Library	0.48	12.97	1.35	36.30	0.012	0.330

FUNCTION: SEARCH ONLY (ILL)

Library	Monthly Average 10^6 Characters Out	Monthly Average 10^6 Characters In	Peak Month 10^6 Characters Out	Peak Month 10^6 Characters In	Peak Hour 10^6 Characters Out	Peak Hour 10^6 Characters In
Simon Fraser University	.32	13.03	.77	31.28	.0073	.298
U.B.C.	.97	39.10	2.32	93.85	.0220	.894
University of Victoria	.48	19.55	1.16	46.93	.0110	.447
B.C.I.T. (Burnaby)	.16	6.52	.39	15.64	.0037	.149
Camosun College (Victoria)	.08	3.27	.20	7.82	.0019	.075
Capilano College (North Van.)	.10	3.91	.23	9.39	.0022	.089
Cariboo College (Kamloops)	.06	2.61	.15	6.26	.0015	.050
Douglas College (Richmond)	.19	7.82	.46	18.77	.0044	.179
David Thompson Univ. Centre (Nelson)	.10	3.91	.23	9.39	.0022	.089
East Kootenay College (Cranbrook)	.03	1.30	.08	3.13	.0007	.030
Fraser Valley College (Abbotsford)	.03	1.30	.08	3.13	.0007	.030
Justice Institute (Vancouver)	.03	1.30	.08	3.13	.0007	.030
Malaspina College (Nanaimo)	.06	2.61	.15	6.26	.0015	.060
College of New Caledonia (Pr. George)	.10	3.91	.23	9.39	.0022	.089
Northern Lights College (Dawson Creek)	.06	2.28	.14	5.47	.0013	.052
Northwest College (Terrace)	.08	3.27	.20	7.82	.0019	.075
Okanagan College (Kelowna)	.06	2.61	.15	6.26	.0015	.060
Open Learning Inst. (Richmond)	.008	.33	.02	.78	.0002	.008
Pacific Vocational Inst. (Burnaby)	.03	1.30	.08	3.13	.0007	.030
Selkirk College (Castlegar)	.06	2.28	.14	5.47	.0013	.052
Vancouver Comm. College (Vancouver)	.19	7.82	.46	18.77	.0044	.179
Burnaby Public Library	.13	5.21	.31	12.51	.0029	.119
Greater Victoria Public Library	.19	7.82	.46	18.77	.0044	.179
Richmond Public Library	.13	5.21	.31	12.51	.0029	.119
Legislative Lib. of B.C.(Victoria)	.07	2.93	.17	7.04	.0017	.067
Ministry of Educ.Lib.(Victoria)	.008	.33	.02	.78	.0002	.008
Vancouver Special Libraries (Vancouver)	.049	1.96	.12	4.69	.0011	.045
New Westminster Public Library	.121	4.89	.29	11.73	.0028	.112
North Vancouver City Library	.089	3.58	.21	8.60	.0020	.082
North Vancouver Dist.Library	.086	3.45	.20	8.29	.0019	.079
Port Moody Public Library	.047	1.89	.11	4.54	.0011	.043
Vancouver Public Library	.32	13.03	.77	31.28	.0073	.298
West Vancouver Memorial Library	.18	7.17	.43	17.21	.0040	.164

Terminal Requirements

DOBIS is designed to utilize IBM 3270-type CRT terminals although this should not necessarily be considered as a constraint by suppliers who wish to propose alternate solutions.

Based upon workload estimates, it is considered that the following CRT terminals are required by location to support the Cataloguing, Acquisitions and ILL functions. The requirement for terminal printers is not at this point known, however suppliers should address in their proposal how they would accommodate terminal printers.

Simon Fraser University	6
U.B.C.	12
University of Victoria	6
B.C.I.T. (Burnaby)	2
Camosun College (Victoria)	1
Capilano College (North Van)	1
Cariboo College (Kamloops)	1
Douglas College (Richmond)	2
David Thompson Univ. Centre (Nelson)	2
East Kootenay College (Cranbrook)	1
Fraser Valley College (Abbotsford)	1
Justice Institute (Vancouver)	1
Malaspina College (Nanaimo)	1
College of New Caledonia (Pr. George)	1
Northern Lights College (Dawson Creek)	1
Northwest College (Terrace)	1
Okanagan College (Kelowna)	1
* Open Learning Inst. (Richmond)	
* Pacific Vocational Inst. (Burnaby)	1
# Selkirk College (Castlegar)	
Vancouver Comm. College (Vancouver)	4
Burnaby Public Library	2
Greater Victoria Public Library	4
Richmond Public Library	2
Legislative Lib. of B.C. (Victoria)	2
* Ministry of Educ. Lib. (Victoria)	
Vancouver Special Libraries (Vancouver)	1
New Westminster Public Library	2
North Vancouver City Library	1
North Vancouver District Library	1
Port Moody Public Library	1
Vancouver Public Library	4
West Vancouver Memorial Library	2

*Contract for cataloguing Support to a Consulting bureau in North Vancouver

Shares with David Thompson University

Disk Storage Requirements

Disk storage is required for

- data base storage
- work areas e.g. sort and data base reorganization
- source file storage and other libraries
- to support the operating system and software products.

Data Base Storage

The average space required for a complete (bibliographic, holdings, copies and access point files) logical record in DOBIS at the National Library in April 1979 was 1707.77 characters.

The BCLN-DOBIS data base will be made up of the following types of bibliographic records:

- those BCUC records converted from the existing computer system (UTLAS) and subsequent updates.
- those source records obtained from the NL-DOBIS data base and subsequent updates.
- those added as a result of the retrospective conversion project (RECON) for Public Libraries.

	BCUC	Source	Recon	Total Records	Characters 10^6 Disk Data Base
March 1981	900,000	1,700,000			
1982	1,020,000	2,500,000	164,000	3,684,000	6,208
1983	1,140,000	2,750,000	328,000	4,218,000	7,037
1984	1,260,000	3,010,000	328,000	4,598,000	7,686
1985	1,380,000	3,311,000	328,000	5,019,000	8,405

Work Areas

The National Library found it necessary to re-organize the DOBIS data base using disk work space because tape was too slow. Accordingly, BCLN-DOBIS would require disk work area equal to the size of the data base.

Other Disk Storage

In comparison with data base and work area space requirements, other requirements for disk storage are small and appropriate estimates should be included by the supplier.

Computer Main Memory Requirements

The National Library currently runs DOBIS on a dedicated IBM 3031 with 4 Megabytes of main memory. The following estimates for BCLN-DOBIS are based upon actual performance of DOBIS at the National Library. This is not to suggest that the same main frame is recommended for BCLN-DOBIS, but rather to provide a base from which suppliers can estimate main memory requirements for their proposed solutions.

On-Line Processing

The National Library estimates the memory requirements to run CICS supporting DOBIS to be:-

1088k + (23k x (number of terminals in use + 5))

where k = 1000 bytes of virtual memory. This estimate is purely to support CICS - DOBIS and does not include the operating system etc.

The BCLN-DOBIS will be required to be on-line between 7:30 a.m. and 6 p.m. Monday through Friday.

Batch Processing

It is expected that the production of batch products together with all data base maintenance activities will be run after BCLN-DOBIS has been brought off-line: during the evenings and week-ends.

Batch Products

It is expected that the following products will be produced each night from the transaction processing of the previous day.

- Catalogue Cards
- Purchase Orders

Remote printer will be required in the university libraries and the larger college libraries (assume 10) and the following will be produced at the end of each month.

- COM Catalogue tapes
- Reports
- Output interface tape

The production of COM tapes is expected to be a long process because of the volume of information (complete bibliographic record of every BCUC holding) being reported. At Centennial College, Toronto, which is running on an IBM 370/148 with two megabytes of main memory the following types of fiche, each containing a full bibliographic record are produced:

- author
- subject
- title
- shelf-list

These COM are not as comprehensive as would be required for the BCLN. To produce each of the above fiche requires at that installation 1 hour of elapsed processing (on a dedicated machine) per 70,000 titles. As the BCUC data base is expected to contain 1,020,000 titles (not including source or RECON) by March 1982 and then grow at 10% annually, production of one fiche at that installation would require 44 hours of elapsed processing.

Because of the inefficiency of selecting all records from the data base for each fiche it is envisaged that the data base will be completely extracted onto a sequential format on tape and subsequent selection and sorting for COM production done on that tape. High-speed tape drives then become essential.

The output interface tapes are required to provide input to member libraries with mini-computer systems. The tapes would contain records added or changed since the last interface tape.

Data Base Maintenance

At the end of each day when BCLN-DOBIS is brought off-line the entire data base will be backed up onto tape. At the beginning of each day the data base is restored from the tape back-up. At NL-DOBIS both the unload and the restore take two hours of elapsed processing for 1.7 million titles.

Also at the end of each day the day's journal of update transactions is backed up to tape.

Data Base re-organization (as opposed to restore) is a lengthy process. At NL-DOBIS, to reorganize every data base file would require in excess of 45 hours elapsed computer processing on a dedicated machine.

Application Software Support

Application software support includes the following functions:

- Data Control
  - troubleshooting
  - interface between the user and computing facility
  - job scheduling and submission

- Data Base Administration
  - maintain data dictionary
  - ensuring the integrity of the physical data base
  - monitor growth and capacity
  - back-up and reorganization
  - security
  - control access to data base
  - initiation of DOBIS on-line

- Application software maintenance
  - implement new software releases
  - keep application software running
  - maintain test versions of software and data bases

- Application software enhancements (assume 3 full time staff)
  - definition of user requirements
  - change application software
  - liaise with systems librarians

RESPONSE INSTRUCTIONS

Interested suppliers are requested to submit written responses to this Request for Information by 2:00 p.m., Friday, 6 March, 1981 to:

Paul Baldwin, Director
B.C. Union Catalogue
7671 Alderbridge Way
Richmond, B.C. Canada
V6X 1Z9

Telephone: (604) 273-9521

A briefing session will be held (see covering letter).

Responses will be evaluated based upon a number of factors including:

- ability to meet the requirements as laid out in this RFI
- cost estimates
- provision of back-up of proposed services
- reliability
- supplier service and support
- expansion capabilities
- maintainability

INVITED RESPONSES

The following companies have been requested to respond to this Request for Information.

Amdahl Limited
200 Granville, Vancouver, B.C.

B.C. Telephone Co.
3777 Kingsway, Burnaby, B.C.

Boeing Computer Services Canada Ltd.
134 Abbott St., Vancouver, B.C.

British Columbia Systems Corporation
1112 Fort St., Victoria, B.C.

Burroughs Business Machines Ltd.
1255 Burrard, Vancouver, B.C.

CNCP Telecommunications
531 Granville, Vancouver, B.C.

Control Data Canada Ltd.
200 Granville, Vancouver, B.C.

Digital Equipment of Canada Ltd.
110 - 10451 Shellbridge Way, Richmond, B.C.

Honeywell Canada Ltd.
1066 West Hastings, Vancouver, B.C.

IBM Canada Ltd.
Data Processing Division
701 West Georgia, Vancouver, B.C.

IBM Canada Ltd.
General Systems Division
1445 West Georgia, Vancouver, B.C.

NCR Canada Ltd.
464 Lougheed Hwy., Burnaby, B.C.

National Data Centre Corp.
181 West Pender, Vancouver, B.C.

Simon Fraser University
Computing Centre
Burnaby, B.C.

Sperry Univac Computer Systems
1177 West Hastings St., Vancouver, B.C.

University of British Columbia
Computing Centre,
Vancouver, B.C.

University of British Columbia
The Library
Vancouver, B.C.

APPENDIX B

BCLN UNION FILE GROWTH ESTIMATES

I. BCUC Data Base Size and Growth at the UTLAS Facility

Library (by Type)	April 1981 Data Base Size	Cataloguing Workload April 1981-March 1982
A. University Libraries		
1. Simon Fraser Univ. (Burnaby, B.C.)	153,000	20,000
2. Univ. of British Columbia (Vancouver, B.C.)	177,000	60,000
3. Univ. of Victoria (Victoria, B.C.)	120,000	30,000
Subtotals	450,000	110,000
B. College/Institute Libraries		
1. BCIT (Burnaby, B.C.)	73,000	10,000
2. Camosun College (Victoria, B.C.)	35,000	5,000
3. Capilano College (North Vancouver, B.C.)	66,000	6,000
4. Cariboo College (Kamloops, B.C.)	50,000	4,000
5. Douglas College (Richmond, B.C.)	89,000	12,000
6. David Thompson Univ. Centre (Nelson, B.C.)	63,500	6,000
7. East Kootenay College (Cranbrook, B.C.)	16,000	2,000
8. Fraser Valley College (Abbotsford, B.C.)	27,000	2,000
9. Justice Institute of B.C. (Vancouver, B.C.)	6,000	2,000
10. Malaspina College (Nanaimo, B.C.)	51,000	4,000
11. College of New Caledonia (Prince George, B.C.)	51,000	6,000
12. Northern Lights College (Dawson Creek, B.C.)	15,000	3,500
13. Northwest College (Terrace, B.C.)	18,500	5,000
14. Okanagan College (Kelowna, B.C.)	39,000	4,000
* 15. Open Learning Institute (Richmond, B.C.)	500	500
16. Pacific Vocational Institute (Burnaby, B.C.)	6,000	2,000
* 17. Selkirk College (Castlegar, B.C.)	67,000	3,500
18. Vancouver Community College (Vancouver, B.C.)	92,000	12,000
Subtotals	765,500	89,500

* Do not have terminals in own quarters at present time.

BCLN UNION FILE GROWTH ESTIMATES

I. BCUC Data Base Size and Growth at the UTLAS Facility

	April 1980 Data Base	Current Cataloguing April 1981-March 1982
C. Public Libraries		
1. Burnaby Public Library	14,000	8,000
2. Greater Victoria Library	12,000	12,000
3. Richmond Public Library	50,000	8,000
	76,000	28,000
D. Other BCUC Members		
1. Legislative Library of B.C.(Victoria)	10,000	4,500
*2. Ministry of Education Library	500	500
3. Vancouver Special Libraries	15,000	3,000
	25,000	8,000
E. UTLAS Based Recon Activity		
1. SFU	n.a.	30,000
2. Univ. of Victoria	n.a.	30,000
		60,000
F. Grand Totals	1,317,000	295,500

Note: Each library file size listed above represents a separate file of MARC bibliographic records in the UTLAS Facility. It is not a measure of unique records.

Estm:(1) 60% or 800,000 of the 1,317,000 are unique bibliographic records.

(2) That current accessions are only 30% are unique.

BCLN UNION FILE GROWTH ESTIMATES

II. Potential New BCUC Member Libraries

Begin Current Cataloguing 1981 or 1982 Library	Annual Titles Catalogued
1. New Westminster Public Library	7,500
2. North Vancouver City Library	5,500
3. North Vancouver District Library	5,300
4. Port Moody Public Library	2,900
5. Vancouver Public Library	20,000
6. West Vancouver Memorial Library	11,000
Subtotal Titles Per Year	52,200

III. Public Libraries RECON PROJECT (Sept.-1981-1982)

(done at NLC DOBIS Facility)	Estimated Records
1. Burnaby Public Library	122,570
2. New Westminster Public Library	122,460
3. North Vancouver City Library	79,630
4. North Vancouver District Library	69,770
5. Port Moody Centennial Library	32,570
6. Vancouver Public Library	399,010
7. West Vancouver Public Library	99,010
8. Greater Victoria Public Library	166,180
Total	1,091,200

Sample estimate of unique records (between 8 libraries): 400,000

OVERLAP of these records with BCUC data base: (?)

BCLN UNION FILE GROWTH ESTIMATES

IV. Estimated Annual Cataloguing Workloads

New Library Holdings	All Types Total	By Type		
		Adds	Mods	Origs.
Current Cataloguing				
1. University Libraries	110,000	55,000	10,000	45,000
2. College/Institute Libraries	90,000	65,000	10,000	15,000
3. Public Libraries	80,000	70,000	10,000	10,000
4. Other	10,000	5,000	2,000	3,000
5. Totals	290,000	195,000	32,000	73,000
RECON ACTIVITIES				
University Libraries	100,000	50,000	10,000	4,000
Grand Totals	390,000	245,000	42,000	77,000

BCLN UNION FILE GROWTH ESTIMATES

V. Summary of BCLN-DOBIS Union File Growth

Period Ending	Bibliographic File	Holdings File
March 31, 1981	900,000	1,612,000
March 31, 1982	1,020,000	2,012,000
March 31, 1983	1,140,000	2,412,000
March 31, 1984	1,260,000	2,812,000
March 31, 1985	1,380,000	3,212,000
March 31, 1986	1,500,000	3,612,000
March 31, 1987	1,620,000	4,012,000

Assumptions:

(1) Bibliographic file grows at an average rate of 120,000 records per year.

(2) Holdings file grows at the rate of 400,000 records per year.

APPENDIX C

POTENTIAL BCLN REVENUE

Prepared by

Paul E. Baldwin
(Director, B.C. Union Catalogue)

Note: The potential BCLN revenue was estimated as the cost of equivalent services from UTLAS. Because UTLAS had not issued its price list for acquisitions services, a WLN price list was used to estimate potential revenue for BCLN acquisitions services.

POTENTIAL BCLN REVENUE - - - SUMMARY

Summary of Potential Revenue in 1980/81 Dollars

1. Expenditures Category	2. Cataloguing Support With Authorities Control	3. Acquisitions Support	4. ILL Searching	5. Total Potential Revenues
A. Data Communications	256,800	169,200	nil	426,000
B. Computer Terminals Lease	71,280	68,640	nil	139,920
C. On-Line Services	912,580	366,600	134,370	1,413,550
D. Batch Services	390,600	50,500	nil	441,100
E. COM Facility	24,890	nil	nil	24,890
F. BCUC COM List	95,800	nil	nil	95,800
G. Totals:	$1,751,950	$654,940	$134,370	$2,541,260

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Summary of 1980/81 BCUC Expenditures for Cataloguing Support Services Purchased from UTLAS

I. 1980/81 BCUC Member Libraries Expenditures	Actual 1980/81 $	Increment for Authorities Control $	Total Potential BCLN REVENUE $
A. Data Communications	236,400	20,400	256,800
B. Computer Terminals Lease	60,720	10,560	71,280
C. CATSS ON-LINE	640,010	272,570	912,580
D. CATSS BATCH	313,500	77,100	390,600
E. COM FACILITY	20,000	4,890	24,890
F. BCUC COM LIST	84,000	11,800	95,800
G. Total Cat.Support Services	$1,354,630	$397,320	$1,751,950

II. Ministry of Education Support of BCUC Office 1980/81

A. Salaries and Wages	129,200
B. Other Expenditures	109,200
C. Total BCUC Office	$238,400

III. University Libraries RECON GRANT	1980/81	
UBC Library	275,000	
U Vic Library	235,000	
SFU Library	205,000	
BCUC Office Authorities Development(Carry Over 32,300)	35,000	Total (67,300)
	$750,000	

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of 1980/81 BCUC Expenditures on Cataloguing Support Services

I. BCUC Member Libraries Actual Usage of UTLAS 1980/81

BCUC Member Type	Source File Records	Other Derived	Orig.	Total New Titles	AV/ AC's	Corrections Updates
On-line Conversion Activities University Libraries	15,000	10,000	10,000	35,000	N.A.	N.A.
Current Cataloguing University Libraries	70,000	12,000	43,000	125,000	30,000	10,000
College/Institute Libraries	65,000	10,000	15,000	90,000	10,000	5,000
Public Libraries	20,000	3,000	2,000	25,000	3,000	2,000
Other Libraries	6,000	2,000	2,000	10,000	nil	1,000
TOTALS	176,000	37,000	72,000	285,000	43,000	18,000

BCUC - UTLAS File Size March 31, 1980: 1,317,000 records

BCUC Records Added 1980/81: 285,000 records

BCUC - UTLAS File Size March 31, 1981: 1,602,000 records

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of 1980/81 BCUC Expenditures on Cataloguing Support Services

		1980/81 $
II.	Data Communications Expenditures 1980/81	
A.	32 Data Route Lines at $412. per month each	158,210
*B.	Interior Data Communications*	69,000
C.	ISAL Dial-up Service	4,200
D.	UTLAS Port Charges 32 at $3.00 per week	4,990
E.	Subtotal data communications expenditures	$ 236,400

*Note: The interior data communications expenditures for 1979/80 were $57,443.40; the Shoffner/ Madden Report had estimated $85,000 for 1979/80.

III.	Computer Terminals and Printers Leased by BCUC Member Libraries 1980/81	
**23 CRT's with printers at $220 per month each		$ 60,720

**Note: The above expenditures excludes any purchased or owned terminals; only UBC and UVic Libraries have invested substantially in purchased equipment. Their expenditures are not reflected here.

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation OF 1980/81 BCUC Expenditures

		1980/81 $
IV.	CATSS On-Line Expenditures 1980/81	
A.	Terminal Connect Time	
(i)	285,000 titles x 8 minutes ÷ 60 = 38,000 hr.	
(ii)	61,000 av/ac/updates x 3 min.ea.= 3,050 hr.	
(iii)	Total estm. hours 41,050 hours	
(iv)	41,050 hours x $9.68 per connect hour =	$ 397,360
	Note: The Shoffner/Madden BCLN Feasibility Study utilized 10 minutes per title catalogued based on actual 1978/79 BCUC experience. 1980/81 use of 8 min. per title assumes a learning curve and also off-set of discounts allowed on connect time by UTLAS.	
B.	Records Access	
	Precise Key record searching only	
	285,000 x 2 avg. searches x $ .0108 each	$ 6,160

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of 1980/81 BCUC Expenditures

	1980/81 $
C. Record Displays	
1. Display of Source Records (Cancelled)	
176,000 x .33 avg. x $ .161 each	9,350
2. Display of Other Records (Cancelled)	
37,000 x .33 avg. x $ .108 each	1,320
3. Subtotal Record Displays (Cancelled)	$ 10,670
D. Record Derivations	
213,000 records at $ .484 each	$ 103,090
E. Record processing	
1. STORE/FILE COMMANDS with Products	
285,000 at $ .323 each	92,060
2. NOIND 43,000 at $ .161 each	6,920
3. FILE/STORE (NO PRODUCTS) 18,000 at $ .215 each	3,870
4. Subtotal Record Processing	102,850

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of BCUC 1980/81 Expenditures on Cataloguing Support Services

	1980/81 $
F. Data Storage Security and Maintenance	
1. File Charges: 30 at $538 each/year	16,140
2. Active Storage: 346,000 record weeks at .0108	3,740
3. Subtotal	19,880
G. Total CATSS On-Line Expenditures 1980/81	$ 640,010

V. CATSS Batch Products Expenditures 1980/81

A. Members' COM Lists (Excluding UBC & UVIC)

Records Selected for Production	
1st Suppl	15,000
2nd Suppl	30,000
3rd Suppl	45,000
4th Suppl	60,000
5th Suppl	75,000
6th Suppl	90,000
Annual Cumml	1,255,000
7th Suppl	15,000
8th Suppl	30,000
9th Suppl	45,000
10th Suppl	60,000
11th Suppl	75,000
	1,795,000

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of BCUC 1980/81 Expenditures on Cataloguing Support Services

	1980/81 $
V. CATSS Batch Products 1980/81 (continued)	
B. Members Own COM Production Cost Estimate	
1. Production Run Charges	
12 runs/year x 23 lists x $ 26.90 each run	7,420
2. Record Selection Charges	
1,795,000 ÷ 1,000 x $ 5.38 per 1,000	9,660
3. Entry Generation and Printing	
1,795,000 x 5.8 avg. entries x .0215 each (less 2% avg. discount)	219,360
4. Subtotal Members' Own COM Lists	$ 236,440
C. Catalogue Cards	
1. Streamed Catalogue Card Sets	
25,000 titles x 7 avg. cards x $ .0645 each	11,290
2. 52 avg. runs at $ 8.06 each	420
3. Shelf List Cards	
290,000 titles x 1.5 avg. x .-591 each	25,710
4. Shelf List Card Runs 52 wk. x 28 libraries x 8.06 ea.	11,740
5. Subtotal Catalogue Cards	$ 49,160

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of BCUC 1980/81 Expenditures on Cataloguing Support Services

V. CATSS Batch Products 1980/81 (continued)

	1980/81 $
D. Magnetic Tape Service	
1. 720,000 records at $ .0376 each	27,070
2. 18 runs at $25.00 each	450
3. Tape Charges	380
4. Subtotal Magnetic Tape Service	$ 27,900
E. Total CATSS Batch Products 1980/81	$ 313,500

VI. COM Facility Charges (Member Libraries)

A. Fiche Masters

		Entries		Page Columns
Authors	1,795,000 x 1.6 =	2,872,000 ÷	9.4 =	305,500
Titles	1,795,000 x 1.3 =	2,333,500 ÷	11.5 =	202,900
Subjects	1,795,000 x 1.9	3,410,500 ÷	8.9 =	383,200
Shelf List	1,795,000 x 1.0	1,795,000 ÷	5.7 =	315,000
				1,206,600

1,206,600 page columns ÷ 414 = 2,916 fiche masters

B. Estimated COM Facility Charges

1. 2,916 fiche masters at $4.90 each	14,300
2. 10 copies each at $.20/copy x 2916 =	5,832
	$ 20,000

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of BCUC 1980/81 Expenditures on Cataloguing Support Services

VII.	BCUC COM List 1980/81	
	A. UTLAS 1st copy charges	69,000
	B. COM COPIES 60 at 250 each	15,000
	C. Total Expenditures	$ 84,000
VIII.	Ministry of Education Support of BCUC Office	
	A. Salaries and Wages	129,200
	B. Other	109,200
	C. Subtotal BCUC Office	230,400
IX.	BCUC Office Authorities Development	
	(grant from UBC/RECON)	$ 67,310
X.	Grand Total BCUC Expenditures Using UTALS 1980/81	$ 1,652,340

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of 1980/81 BCUC Expenditures on Cataloguing Support Services

XI. Incremental Expenditures by BCUC Member Libraries if Authorities Control Were Implemented 1980/81

A. Assumptions

In order to compare an equivalent UTLAS usage with DOBIS, it is assumed that Members would link all headings to an authority record; and where none exists, the Members would create an authority record prior to filing their bibliographic records.

1. Titles Validated and Linked to Authorities Records 1980/81

   a. 285,000 new titles catalogued

   b. 18,000 corrections re-validated

   C. 303,000 total records validated and filed

2. Authorities Records Created and Filed by Members

   a. Names: 303,000 x 1.6 entries/title x .20 = 100,000

   b. Subjects: 303,000 x 1.9 entries/title x .50 = 300,000

   c. Series/Titles: 303,000 x .20 entries/title x .90 = 50,000

   450,000

3. Additional Correct Time Required

   a. Bibliographic Records 303,000 x .75 min. ÷ 60 = 3,790

   b. Additional time for authority records 450,000 x 1.25 min.÷ 60 = 9,370

   13,160 Hours

4. Additional Data Routes & Terminals: (4)

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of 1980/81 BCUC Expenditures on Cataloguing Support Services

XI. Incremental Expenditures for Authorities Control 1980/81 (continued)

	1980/81 $
B. Data Communications Expenditures	
1. Four Data Route Lines at $412/mnth ea.	19,780
2. UTLAS Port Charges 4 at $ 3.00/wk. ea.	620
	$20,400
C. Additional Computer Terminals and Printers	
Four at $220. per month leased from B.C. Tel	$10,560
D. CATSS On-Line Expenditures	
1. Terminal Connect Time 13,160 Hours at $ 9.68	127,390
2. Records Access: Browsable 300,000 x .0323	9,690
3. Authority Record Displays: 200,000 at $ .0538	10,760
4. Bibliographic Record Validations: 303,000 x 2 x$.0538ea	32,280
5. File Commands for Authority Records: 430,000 x$.215 ea	92,450
6. Subtotal CATSS On-Line Expenditures	$ 272,570

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of 1980/81 BCUC Expenditures on Cataloguing Support Services

XI. Incremental Expenditures for Authorities Control 1980/81 (continued)

E. Batch CATSS Products

For purposes of comparison, it is assumed that all bibliographic records are linked to authority records. Assume one x-reference is generated per five authority records.

1.	Author Entries Linked:	7,488,000 x .00323 =	24,190
2.	X-refs. for names:	1,497,600 x .00323 =	4,840
3.	Subject Entries Linked:	8,892,000 x .00323 =	28,720
4.	Subject x-refs.:	1,778,400 x .00323 =	5,740
5.	Titles/Series:	6,084,000 x .20 x .00323 =	3,930
6.	Title/Series x-refs.:	243,360 x .00323 =	790
7.	Subtotal Incremental COM Costs		$ 68,210
8.	Magnetic Tape Incremental Costs		
	a. 620,000 records x 3.7 x .00323		7,410
	b. x-refs. 458,800 x .00323		1,480
	c. Subtotal		$ 8,890
9.	Total Batch CATSS Products		$ 77,100

POTENTIAL BCLN REVENUE - Cataloguing Support Services

Detailed Calculation of 1980/81 BCUC Expenditures on Cataloguing Support Services

XI. Incremental Expenditures for Authorities Control 1980/81 (continued)

F. Incremental COM Facility Charges

1. Additional Master Fiche

1,497,600 name x-refs.
1,778,400 subject x-refs.
243,360 title/ser x-refs.

3,519,360 x-refs. ÷ 414 = 708 additional master fiche at $4.90 — $ 3,470

2. Copies 10 x 708 x .20 ea. — 1,420

3. Subtotal incremental COM Facility Expend. — $ 4,890

G. BCUC COM List Incremental Expenditures

A. Master Fiche 708 x .67 x $ 4.90 — 2,320

B. Copies 474 masters x 100 x .20 ea. — 9,480

$ 11,800

POTENTIAL BCLN REVENUE - Aquisitions Services

I. WLN Acquisitions Services Price List In Canadian Funds

(Note: This information is taken from the 1979/80 WLN Price Schedule)

	U.S. Funds	Canadian Funds
A. On-Line Service Charges		
1. Basic per terminal fee	$ 140/month	$ 170/month
2. Per Order fee	$ 1.05/order	$ 1.25/order

(Note: The Per Order fee includes: (1) creation of in-process record; creation of unlinked order; or movement of standing order to the in-process file. (2) On-line update support including full fund accounting. (3) Also an average of 3.5 inquiry searches per order.)

3. Monthly Standing Order Storage	$ .0035/record /month	$ .0042

	U.S. Funds	Canadian Funds
B. batch Products		
1. Order Forms	.15 each	.18 each
2. Claim Letters	.18 each	.22 each
3. Receiving Report:		
Proof	.18 each	.22 each
Final	.24 each	.29 each

POTENTIAL BCLN REVENUE - Acquisitions Services

I. WLN Acquisitions Services Price List In Canadian Funds (continued)

	U.S. Funds	Canadian Funds
4. Purchase Order List	.02/entry	.024/entry
Copies	.003/entry	.0036/entry
5. Title Index to In-Process File	.02/entry	.024/entry
Copies	.003/entry	.0036/entry
6. Detailed Encumbrance Report	.02/entry	.024/entry
7. Vendor Report	.05 each	.06 each
8. Processing Slips	.07 each	.084 each
9. Notify Report	.05 each	.06 each
10. Account Status Report	2.00 per wk.	2.40 per wk.
11. Copy to History File		
Paper original	.08/record	.096/record
Paper copies	.012/record	.0144/record
COM original	.08/record	.096/record
COM copies	.0006/record	.00072/record

POTENTIAL BCLN REVENUE - Acquisition Services

		1980/81 $
II.	Acquisitions Data Communications Expenditures 1980/81	
	A. 26 data route lines at $412 per month	128,500
	B. Interior data communications	34,500
	C. ISAL Dial Up Service	2,100
	D. UTLAS Port Charges 3.00/wk./terminal	4,100
	E. Subtotal ACQ data communications	$169,200
III.	Computer Terminals and Printers Leased by BCUC Member Libraries - ACQ. 1980/81	
	26 at $220 per month	$ 68,640
IV.	ACQ. On-Line Expenditures	
	A. Terminal Charge	
	26 at $170 per month	$ 53,040
	B. Per Order Fee	
	250,000 orders at $1.25 each	312,500
	C. Monthly Standing Order Storage	
	25,000 at $ .0035/month	1,060
	D. Subtotal On-Line ACQ Expenditures	$ 366,600

POTENTIAL BCLN REVENUE - Acquisitions Services

		1980/81 $
V.	Acquisitions Batch Products	
	A. Order Forms	
	250,000 at .18 each	45,000
	B. Claim Letters	
	25,000 at .22 each	5,500
	C. Subtotal Batch Products	$ 50,500
VI.	Grand Total Acquisitions Expenditures	$654,940

POTENTIAL BCLN REVENUE - ILL Searching

UTLAS offers a bibliographic searching service called REF CATSS. The UTLAS price for REF CATSS Usage has been used for estimating potential BCLN Revenue for ILL Searching.

I. Assumptions

A. 250,000 Inter-Library Loans Searches per year.

B. An average of sixty (60) searches conducted per terminal connect hour.

C. No additional data communications lines or terminals are required by the member libraries in order to perform ILL searches.

II. Cost Estimate	1980/81 $
250,000 searches ÷ 60 = 4,160 connect hours at $32.30 per connect hour	$ 134,370